

**REPORT TO THE ALASKA BOARD OF FISHERIES  
KUSKOKWIM AREA, 1995**

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# TABLE OF CONTENTS

	<u>Page</u>
LIST OF TABLES . . . . .	iii
LIST OF FIGURES . . . . .	iv
GEOGRAPHICAL DESCRIPTION . . . . .	1
ESCAPEMENT MONITORING AND RUN ABUNDANCE ASSESSMENT . . . . .	1
SUBSISTENCE FISHERY . . . . .	2
SUMMARY OF THE 1995 SEASON . . . . .	3
Kuskokwim River (Districts 1 and 2) . . . . .	3
Chinook Salmon . . . . .	5
Sockeye Salmon . . . . .	5
Chum Salmon . . . . .	6
Coho Salmon . . . . .	6
Kuskokwim Bay . . . . .	8
Quinhagak (District 4) . . . . .	8
Goodnews Bay (District 5) . . . . .	9
OUTLOOK FOR 1996 . . . . .	10
Chinook Salmon . . . . .	10
Districts 1 and 2 . . . . .	10
District 4 . . . . .	11
District 5 . . . . .	11
Sockeye Salmon . . . . .	11
Districts 1 and 2 . . . . .	11
District 4 . . . . .	11
District 5 . . . . .	12
Chum Salmon . . . . .	12
Districts 1 and 2 . . . . .	12
District 4 . . . . .	12
District 5 . . . . .	13
Coho Salmon . . . . .	13
Districts 1 and 2 . . . . .	13
Districts 4 and 5 . . . . .	13
TABLES . . . . .	14
FIGURES . . . . .	42

# LIST OF TABLES

	<u>Page</u>
1. Utilization of Kuskokwim River chinook salmon, 1960-1995 . . . . .	15
2. Estimated dollar value of Kuskokwim Area commercial salmon fishery, 1964-1995 . . . . .	16
3. Kuskokwim Area commercial, subsistence, and personal use salmon catches, 1913-1995 . . . . .	17
4. Mean salmon weights and prices paid to commercial permit holders in the Kuskokwim Area, 1967-1995 . . . . .	20
5. Commercial Fishing Effort in Kuskokwim Area by Permit-Hour, 1960-1995 . . . . .	21
6. Executive summary of working group and department actions, 1995. . .	22
7. Lower Kuskokwim River, District 1, commercial salmon harvest and fishing effort by period, 1995. . . . .	25
8. Middle Kuskokwim River, District 2, commercial salmon harvest and fishing effort by period, 1995 . . . . .	26
9. District 1 and District 2 combined commercial salmon harvest, 1960-1995 . . . . .	27
10. Chinook salmon sex ratios and proportion of females with gill net marks, Kogrukluks weir, 1979-1995 . . . . .	28
11. Historic salmon escapement data from current Kuskokwim Area projects, 1976-1995 . . . . .	29
12. Utilization of Kuskokwim River chum salmon, 1960-1995. . . . .	31
13. Quinhagak District commercial effort 1970-1995 . . . . .	32
14. Quinhagak, District 4, commercial salmon harvest and fishing effort by period, 1995 . . . . .	33
15. Quinhagak District commercial salmon harvest, 1960-1995 . . . . .	34
16. Kanektok River peak aerial surveys by species, 1962-1995 . . . . .	35
17. Ex-vessel Value of Kuskokwim Area Salmon Catch by District, 1995 . .	36
18. Goodnews Bay, District 5, commercial salmon harvest and fishing effort by period, 1995 . . . . .	37
19. Goodnews Bay, District 5 commercial effort 1970-1995 . . . . .	38
20. Goodnews Bay District commercial salmon harvest, 1968-1995. . . . .	39
21. Historical estimated salmon run size and commercial exploitation rate, Goodnews River, 1981-1995 . . . . .	40
22. Preliminary projections of the 1996 Kuskokwim Area commercial salmon harvests in thousands of fish by species . . . . .	41

## LIST OF FIGURES

	<u>Page</u>
1. Kuskokwim Area map . . . . .	43
2. Kuskokwim Management Area, District W-1 . . . . .	44
3. Kuskokwim Management Area, District W-2 . . . . .	45
4. Kuskokwim Management Area, District W-4 . . . . .	46
5. Kuskokwim Management Area, District W-5 . . . . .	47
6. Kuskokwim River chinook salmon escapement index, 1975-1995 . . . . .	48
7. Commercial Coho CPUE in District W-2, 1985-1995 . . . . .	49

## GEOGRAPHICAL DESCRIPTION

The Kuskokwim Area includes the Kuskokwim River drainage and all waters of Alaska that flow into the Bering Sea between Cape Newenham and the Naskonat Peninsula (Figure 1). Commercial salmon fishing takes place in four districts. District 1, Lower Kuskokwim River, is the portion of the Kuskokwim River upstream of Popokamiut to the regulatory markers located at Bogus Creek about nine miles above the mouth of the Tuluksak River (Figure 2). District 2, Middle Kuskokwim River, is the Kuskokwim River upstream from regulatory markers approximately eight miles downstream of Lower Kalskag upstream to the regulatory markers at Chuathbaluk (Figure 3). District 4, Quinhagak, is in Kuskokwim Bay between the mouth of Weelung Creek and the south mouth of the Arolik River (Figure 4). District 5, Goodnews Bay, is the waters inside of Goodnews Bay (Figure 5).

## ESCAPEMENT MONITORING AND RUN ABUNDANCE ASSESSMENT

The major spawning systems in the Kuskokwim Area received provisional spawning escapement objectives in 1983. The objectives were typically the average escapement counts obtained under acceptable conditions in these systems using available data. The objectives represented the minimum escapement levels needed to maintain salmon stocks at historic levels of abundance. Continuing evaluation of the escapement data provided for refinements to the objectives. Annual assessment of spawning ground escapement is provided by aerial surveys, weirs and sonar projects (Figure 1).

Aerial surveys are conducted in "key" streams and lakes throughout the Kuskokwim Area. The surveys are best suited for indexing chinook and sockeye escapement. Surveys are typically conducted when these species are at peak abundance on the spawning grounds. The success and accuracy of aerial surveys are often hampered by turbid water conditions and inclement weather.

In addition to aerial surveys, Kuskokwim River spawning ground escapements are also monitored at Kogrukluk River weir and Aniak River sonar. Kogrukluk River weir is the oldest continuous escapement project operated by the Department in the Kuskokwim Area, excluding aerial surveys. Salmon migration travel time from the upper end of District 1 to the weir is thought to be 20 to 25 days. Travel time to Aniak River sonar is thought to be 10 to 12 days. The Aniak River is thought to be the single largest producer of chum salmon in the Kuskokwim drainage. Aniak River sonar is typically only operated during the chum salmon season. Escapement projection models have been developed for both the Kogrukluk and Aniak projects. The projections help provide a more timely estimate of the final escapement by extrapolating the in-season counts by the historical percentage of run passage through the most recent date.

In District 4, aerial surveys are the only means currently employed to assess spawning ground escapement. But in District 5, escapement is assessed by means of the Goodnews River weir as well as by aerial surveys (Figure 1). Salmon migration time from the fishing district to the weir on the Middle Fork of the Goodnews River is just a few days and timely enough to be of use for in-season management needs. The weir has improved the Departments' management ability in District 5.

Except for District 5, timely spawning ground escapement estimates for in-season use by management are difficult to obtain in the Kuskokwim Area. In District 4 such timely estimates are limited to an occasional aerial survey. Consequently, in-season management in District 4 emphasizes the use of commercial catch data. In the Kuskokwim River most spawning streams are many miles upstream of the commercial fishing district so there is a long delay between commercial fishing

periods and the observed fish passage at escapement projects. The delay in the observable impact is typically too late for adjustment of fishing effort. The escapement projection models described earlier have only had modest usefulness for in-season management needs. Kuskokwim River in-season management depends primarily on commercial catch data, test fisheries and Kuskokwim Main River sonar.

When using commercial harvest information managers compare current year commercial catch-per-unit-effort data (defined as catch per boat-hour) with historic data in order to provide an in-season assessment of run strength. However the usefulness of this approach is confounded by variability in the length of commercial fishing periods and other variables that influence the actual "effort" applied by fishers. The practicality of this approach is also limited by the need to have a commercial fishing period in order to make an assessment.

Daily in-season assessment of run strength is also available from three drift gillnet test fisheries operated on the Kuskokwim River (Figure 2). The Lower Kuskokwim Test Fishery (river mile 25) is operated as a partnership between the Association of Village Council Presidents, the Bering Sea Fishermen's Association, and the Department. This was the first year of operation for the Lower Kuskokwim Test Fishery. It is essentially a redesign of its precursor, the Eek Test Fishery (1988-1994), however the design changes are significant enough to make data from the two projects not comparable. The Department's Bethel test fishery (river mile 80) began in 1984 and is the oldest operating test fishery in the area. The Aniak test fishery (river mile 220) began in 1992 and is operated as a partnership between the processor in Aniak and the Department.

A more recently developed run assessment tool is the Kuskokwim River sonar project. This project is located on the mainstem Kuskokwim River near Bethel (river mile 80). Sonar is used to estimate total fish passage which is then apportioned to species with data from an intensive gillnetting program. Development of this sonar project began in 1988. Significant changes and innovations were tested in 1992 and incorporated into the program in 1993. In 1995, the project was only operated through 20 July, which precluded assessment of coho salmon.

#### **SUBSISTENCE FISHERY**

The priority use of the Kuskokwim Area salmon resource is subsistence. The Kuskokwim Area subsistence salmon fishery is a large and important fishery, with over 1,300 families participating. Subsistence catches of chinook salmon in the Kuskokwim River normally exceed the commercial catch of this species (Table 1). All districts have more time for subsistence fishing than commercial fishing. For example, in 1995 salmon were available for about 100 days in District 1; during this time subsistence fishing was open for 80 days, while the subsistence closures associated with commercial fishing were operative for 20 days.

The subsistence fishery is subject to few restrictions. Some restrictions are necessary to deter illegal commercial fishing and ensure adequate escapement. Short closures before, during, and following commercial periods discourage illegal commercial fishing during the open subsistence fishing periods. In District 1 this subsistence closure includes the commercial fishing district, Kuskokuak Slough, and the Kuskokwim River between Districts 1 and 2, but not the spawning tributaries. In Districts 2, 4, and 5 the subsistence closures apply to the commercial districts and spawning tributaries.

Subsistence catch statistics for 1995 have not been analyzed at this time. The Subsistence Division mailed 1995 subsistence "catch calendars" and household reply cards to over 1,500 Kuskokwim Area households. Calendar collection and

interviews occur during house to house surveys in October and November. This timing provides more complete catch data, particularly for coho salmon, but does not allow us to present the Board of Fisheries 1995 data by January 1996.

#### SUMMARY OF THE 1995 SEASON

The Alaska Department of Fish and Game, Division of Commercial Fisheries Management and Development, manages the subsistence and commercial fisheries in the Kuskokwim Area. The Department's goal is to manage both fisheries on a sustained yield basis within the policies set forth by the Alaska Board of Fisheries (Board).

Commercial fishing regulations set maximum gill net specifications of 6-inch or smaller mesh, 50 fathoms in length and 45 meshes in depth for all districts. Fishing periods in District 1 and 2 are usually six hours in duration from 1:00 p.m. until 7:00 p.m., as required by the management plan. In Districts 4 and 5 fishing periods are normally 12 to 36 hours in length. Permit holders prefer fishing during daylight hours so the periods are normally 9:00 a.m. until 9:00 p.m. Permit holders can transfer freely between districts.

The 1995 Kuskokwim Area salmon season opened by emergency order in District 4, Quinhagak on 13 June. The salmon season closed by regulation on 8 September following the final fishing period in District 4 on 6 September.

In 1995, 829 of the 832 Kuskokwim Area permit holders made at least one landing. This is a record for the number of permits fished in the Kuskokwim Area (Table 2). The total commercial catch was 72,352 chinook, 198,045 sockeye, 555,539 coho, 318 pink and 707,212 chum salmon (Table 3).

The chinook salmon catch was above the ten year average (1985-1994) of 58,062 (Table 3). The average price per pound for chinook salmon was \$0.60, below the ten year average price of \$0.76 per pound (Table 4). The sockeye salmon catch was above the ten year average of 162,321 (Table 3). The \$0.71 price per pound paid for sockeye salmon was below the ten year average price of \$0.91 per pound (Table 4). The coho salmon catch was about average for an odd year (Table 3). The average price per pound for coho of \$0.41 was the lowest paid since 1983 (Table 4). The pink salmon catch was average for an odd year (Table 3). Pink salmon brought an above average price of \$0.12 a pound (Table 4). The chum salmon catch was above the average catch of 533,990 (Table 3). The price of \$0.18 per pound was the lowest since 1973 (Table 4).

Kuskokwim permit holders received \$4,209,752 for their catch (excluding bonuses and other incentives not reported on fish tickets). The value of the catch was 24 percent below the previous ten year average of \$5,538,242 (Table 2). The average permit holder received \$5,078 (Table 2). This was 26 percent below the previous ten year average value per permit holder of \$6,860.

Weak chum salmon markets limited the processing capacity available in the Kuskokwim Area in 1995. This caused a reduction in fishing time in the Kuskokwim River which reduced the number of permit-hours in 1995 (Table 5). Permit-hours were below average in Districts 1 and 2 due to shorter than normal openings during the chum salmon fishery. Effort was above average in Districts 4 and 5 due to strong salmon runs.

#### *Kuskokwim River (Districts 1 and 2)*

The Kuskokwim River Salmon Management Working Group (Working Group) continued to work closely with the Department in 1995. Representatives of Kuskokwim River

salmon users comprise the Working Group. Through uncommon dedication by all the concerned parties the Working Group provided in-season management recommendations that helped accomplish management objectives (Table 6). During the season the Working Group met 20 times to evaluate the status of the salmon runs and make recommendations to the Department.

The 1995 chum salmon return was projected to be near average. The return of five year old fish, spawned in 1990, were expected to be average based on their strong return as four year old salmon in 1994. The four year old chum salmon from the 1991 escapement were expected to be average in abundance based on parent year escapement.

There were nine commercial fishing periods during the chum salmon season in District 1, the lower Kuskokwim River (Table 7). There were eight commercial openings targeting chum salmon in District 2, the middle Kuskokwim River (Table 8). A total of 605,918 chum salmon were harvested by approximately 720 permit holders (Table 9). This was the third highest chum salmon harvest on record. The average price per pound for chum salmon was \$0.18 making the ex-vessel value of the catch worth \$742,478.

With one exception, all openings during the commercial chum salmon fishery were 4 hours in length. The shorter periods were necessary because of limited processing capacity due to poor chum salmon markets and the need to increase the quality of the catch. Comparison of commercial catches with historical catches from corresponding time periods was difficult to evaluate when comparing catches from 4 hour periods in 1995 with historical catches from 6 or 8 hour periods.

Run assessment through mid-June showed weak chum salmon abundance. On 18 June the Working Group and the Department decided to meet again to reassess the run. By 20 June, indicators showed increasing chum salmon run strength so the Working Group and the Department agreed to open the commercial fishery on 22 June for 4 hours downstream of Bethel in compliance with 5 AAC 07.365 KUSKOKWIM RIVER SALMON MANAGEMENT PLAN. The catch of 49,157 chum salmon was near the historical average for that date.

For the remainder of the chum salmon season, run strength indicators generally suggested an average run. There were essentially two commercial fishing periods per week until 21 July. Harvests from the first six periods (22 June to 10 July) were above historical average catches for their respective calendar date. In all cases, catches from 4 hour periods were being compared to historical periods of 6 to 8 hours in length.

In the three commercial openings following the 10 July period, catches declined rapidly to levels below average historical catches. On 24 July the Working Group and the Department agreed to stop fishing until the coho salmon run was strong enough to resume commercial fishing.

The first period in District 2 on 26 June was the only one in which there was a processor available to buy fish in the district. Effort dropped from 16 permit holders on 26 June to an average of 7 permit holders per period for the balance of the chum salmon season (Table 8). Low prices and a relatively long run to the tender made fishing unprofitable for many permit holders from District 2.

Based on the strength of the coho salmon run, the Department and the Working Group agreed to reopen the commercial fishery on 4 August for 6 hours in Districts 1 and 2. Many permit holders sat out this opening to protest the lower than expected prices paid for coho salmon. Only 234 of the 600+ permit holders which were expected to participate, fished during this period. Even though prices did not increase, effort in District 1 increased to normal levels following this period. Effort in District 2 continued to be about half historical levels due to the lack of a buyer in the District.

The Working Group set a total of 9 fishing periods in District 1 (Table 7) and District 2 (Table 8) during the 1995 coho salmon season. During the management of coho salmon, the Working group agreed with the Department's recommendation to fish for 6 hours for all periods. The Kuskokwim River was closed to commercial fishing after the last period on 1 September.

Coho salmon management during 1995 went relatively smoothly because indicators of run abundance suggested that escapement goals would be met in the Kuskokwim River drainage.

### **Chinook Salmon**

The combined commercial and subsistence chinook salmon harvest has increased from an average of 56,000 fish from 1960-1969 to 100,524 during 1985-1994 (Table 1). A conservation concern for Kuskokwim River chinook salmon arose following a series of years with poor chinook salmon escapements in the mid 1980's (Figure 6). Besides the poor escapements, the low number of female chinook salmon in the escapement compounded the conservation concern (Table 10).

Beginning in 1984, the Board began restricting the commercial fishery because the Department was unable to correct the problem through in-season management measures. In 1985, a shift to 6-inch or smaller commercial gillnets reduced the harvest of larger female chinook salmon. This gear change was successful in reducing the sex ratio of the commercial catch from 43 percent to 29 percent female. However, total escapement continued to decline (Figure 6). To provide for the subsistence harvest and maintain average spawning escapements the directed commercial harvest of chinook salmon was prohibited in 1987. This action resulted in chinook salmon approaching or reaching the escapement objective in subsequent years (Figure 6). An unexpected benefit of this action was an increase in the commercial harvest of chinook salmon (Table 1). The subsistence fishery continues to target large chinook salmon with "king" gear. Improved survival (perhaps related to reductions and most recently elimination of the directed high seas salmon fishery) played a role in the success of these management changes.

Since 1987 the chinook salmon catch has been incidental to the chum salmon fishery in Districts 1 and 2. In 1995 the commercial harvest of 30,846 was below the recent ten year average of 35,577 (Table 9). This is likely due in part to the delayed start of the commercial fishery.

Chinook salmon escapement goals were achieved in 1995 (Figure 6). A strong run of chinook salmon, the relatively late start of the commercial fishery and shorter openings produced one of the highest escapement indices on record.

### **Sockeye Salmon**

The sockeye salmon catch is incidental to the chum salmon fishery in Districts 1 and 2. Before 1981, sockeye and chum salmon were not accurately differentiated in commercial or subsistence catches. This prevented an accurate record of the sockeye and chum salmon harvest in the Kuskokwim River. Sockeye salmon comprised 5 to 33 percent of the sockeye-chum salmon catch since 1981. Before 1981, the reported sockeye salmon catch was less than 2 percent of the sockeye-chum salmon catch (Table 3). In 1995 the commercial harvest of 92,500 sockeye salmon was above the recent ten year average of 83,786 (Table 9).

Sockeye salmon escapement is documented ancillary to the other species. The Kogrukluks weir escapement estimate of 10,996 sockeye salmon in 1995 was above average (Table 11).

## **Chum Salmon**

Before 1971, chum salmon were an incidental catch during the chinook and coho directed salmon fisheries. The expansion of the commercial chum salmon fishery began in 1971. Based upon 1924-1943 subsistence harvest estimates, a total chum salmon harvest of 400,000 appeared to be consistent with the reproductive potential of the run (Table 12). A combined commercial and subsistence catch of 400,000 chum salmon was the management goal from 1971 to 1979. Subsistence catches for the entire river have declined since the inception of the commercial fishery in 1971 (Table 12). From 1971 to 1980 the average subsistence harvest was 173,680. The average harvest declined to 127,862 for the period 1981 to 1990 (Table 12). This is due to the decline in the use of dog teams for transportation, not the increased commercial harvest.

The commercial chum salmon harvest for the Kuskokwim River (Districts 1 and 2) has averaged 476,637 salmon in the last ten years (Table 9).

The following guidelines manage the commercial harvest:

1. Chum salmon run assessment projects indicate that escapements will be adequate.
2. Commercial catch per unit effort compares to previous years when escapement was adequate.
3. Subsistence fishers report adequate subsistence catches.

Declining run strength normally results in a 1 to 2 week closure beginning in the last half of July. Before 1985, only that portion of District 1 downstream of Bethel was open to commercial fishing during the chum salmon fishery. The Board instructed the Department to use the entire length of District 1 beginning in 1985. This increased the efficiency of the fleet and resulted in low chum escapements in 1986 and 1987. Runs in 1988 and 1989 were at record high levels, but to reach escapement objectives required more time between fishing periods. The 1990 and 1991 runs were smaller but a 4 to 6 day spacing between periods resulted in approaching or reaching chum salmon escapement objectives.

The Kuskokwim River has two major channels at the site where the Eek test fishery occurred. The Eek test fishery, which operated in only the eastern channel, was a very poor indicator of chum salmon run strength in 1994. In 1995 the project was redesigned to include drift stations in both channels. The redesigned project, renamed the Lower Kuskokwim test fishery, was a good predictor of the commercial catch below Bethel in 1995. The Bethel test fish index for chum salmon was an accurate indicator of commercial catches above Bethel and a good gauge of chum salmon run strength. The Aniak test fishery (in its fourth year of operation) had record indices for chum salmon. Escapement estimates from the Kogrukluk Weir and Aniak River Sonar indicated that chum salmon escapement objectives were met for those systems (Table 11).

At the Kogrukluk Weir, parent year escapements were below objective by 11 percent in the 1990 and 19 percent in the 1991 brood years. Escapement past the Aniak Sonar was 7 percent below objective in 1990 and 26 percent above objective in 1991. The observed contribution of 5 year old chum salmon was about as expected based on the number of 4 year olds in 1994. The contribution of 4 year old fish in the 1995 return was 58 percent, slightly below the historic average contribution of 64 percent.

## **Coho Salmon**

Kuskokwim River managers have a limited number of indicators of coho salmon abundance in the drainage: three test fisheries (Lower Kuskokwim, Bethel and Aniak), Kogrukluk River weir, commercial catch data and an informal collection of subsistence data. Kogrukluk River weir has a coho salmon escapement objective

of 25,000 fish. Commercial catch per unit effort (CPUE) in District 2 during coho season is being assessed as an indicator of abundance of coho salmon above District 1. The CPUE in District 2 has been useful when weir data is unavailable.

Traditionally, coho salmon (locally called "rain fish") were not well utilized because of poor drying conditions during the delta's rainy fall weather. Subsistence use of coho salmon has increased in areas where freezers are available to preserve fish. In recent years, Subsistence Division staff have started their surveys after coho salmon have completed migration to the upper river villages. This has probably increased numbers of coho salmon reported because subsistence users have completed their coho salmon catches by the time the survey data is collected in October and November.

Commercial fishing begins to target coho salmon in the Kuskokwim River when that species predominates in the commercial fishery. Run strength is assessed by evaluating catches in the test fisheries, CPUE of the commercial fleet, and escapement trends at Kogruklu River weir. Fishing periods are simultaneous in Districts 1 and 2 throughout the season which closes by regulation on September 1. Record runs in 1984 and 1994 as well as a late run in 1989 resulted in extensions of the season into September. The management strategy is similar to chum salmon.

In the most recent 20 years of fishing for this species, catches have ranged from the 1983 catch of 196,000 coho salmon to the record harvest in 1994 of 724,689 fish (Table 9). The most recent ten year average harvest is 531,000 fish. In the Kuskokwim area, coho salmon runs appear to be stronger in even years. Since 1985 when both districts have had buyers, permits have ranged from 650 to 775. In 1995 a total of 721 permit holders harvested 471,461 coho salmon in the Kuskokwim River districts.

Under joint management of the commercial fishery with the Kuskokwim River Management Working Group, the coho salmon escapement goal at the Kogruklu River weir has been achieved in four out of eight years. Distrust by the public of the Bethel test fishery, lag time of Kogruklu River weir escapements, and lack of sufficient additional data contributed to the overfishing. The Department's uncertainty during the early portions of the run often caused corrective actions to come too late to make a significant difference in escapement needs to the upper drainage as indexed by Kogruklu River weir. Escapement at Kogruklu Weir in the last few years has increased and appears to be closer to achieving or exceeding escapement goals.

In 1995, Kogruklu River weir operated for a portion of the coho migration period. Based on an early run timing model, an estimate of 27,856 coho salmon escaped, which exceeds the escapement goal of 25,000 fish (Table 11).

In the last decade, when buyers have been present in District 2, commercial fishing has been simultaneous with District 1. The commercial fishing effort in District 2 has been fairly consistent and this has provided a CPUE that has correlated with escapement monitored at the department's weir on the Kogruklu River. An average CPUE for periods between 1 August and 21 August of 43 or greater has resulted in the escapement goal being reached. The 1995 cumulative CPUE was 54. This may be artificially high due to the lower than normal participation in the fishery.

The Bethel Test Fishery cumulative CPUE index in 1995 was comparable to years when Kogruklu Weir achieved escapement. The delayed opening of coho salmon fishing probably allowed a number of coho salmon to escape the commercial fishery.

## Kuskokwim Bay

### Quinhagak (District 4)

District 4 is located in the marine waters adjacent to the village of Quinhagak at the mouth of the Kanektok River, about 25 miles south of the Kuskokwim River (Figure 4). Commercial fishing occurs only in the marine waters of Kuskokwim Bay to ensure adequate escapement of salmon into the Kanektok and Arolik Rivers. Commercial fishing occurs primarily in the tidal channels that radiate out into the bay from freshwater streams in the district.

Commercial fishing effort in this district has increased considerably in the last decade. Effort in the last two decades has ranged from 117 permits in 1982 to a record high during the 1993 season of 409 permit holders (Table 13). The previous 10 year average is 326 permit holders (Table 13). In the Kuskokwim Area, permit holders have unrestricted movement between commercial fishing districts. Recent changes in the June, Kuskokwim River commercial fishery have resulted in a shift in effort to this district, which has a directed chinook salmon fishery.

District 4 opened on 13 June in compliance with 5 AAC 07.367 DISTRICT 4 SALMON MANAGEMENT PLAN, which requires an opening before 16 June. This first opening resulted in an above average catch for chinook salmon (Table 14). Commercial fishing continued two times a week until sockeye salmon dominated the catch during the 29 June opening. Above average chinook salmon catches in the commercial and subsistence fisheries suggested an above average run. Commercial fishing remained on a regular schedule of three 12 hour periods per week until 8 September when it closed by regulation. In 1995, early aerial surveys of the Kanektok River drainage were unsuccessful due to high turbid water. During the 1995 season, 382 permit holders made commercial deliveries (Table 14).

The chinook salmon catch of 38,584 is the second highest catch on record, well above the 10 year average of 19,262 (Table 15). Buyers paid an average price of \$0.60 per pound. The ex-vessel value of chinook salmon was \$417,000.

The directed sockeye salmon fishery peaked on 10 July at 9,894 sockeye salmon. The sockeye salmon catch of 68,194 is above the ten year average of 42,948 fish (Table 15). Poor aerial survey conditions continued during the sockeye salmon migration and escapement estimates are unavailable. The average price paid for sockeye salmon was \$0.71 per pound. The ex-vessel value for sockeye in District 4 was \$326,700.

Chum salmon are an incidental catch in the chinook and sockeye salmon commercial fisheries in District 4. The 1995 chum salmon catch was 81,463; which is twice the 10 year average of 40,509 fish (Table 15). Chum salmon brought an average of \$0.18 per pound, resulting in \$106,000 in payment to permit holders (Table 17). Escapement for chum salmon is unknown due to poor aerial survey conditions.

Coho salmon dominated the commercial catch in this district on 31 July. Commercial catches, when compared with historical catches, indicated that the coho salmon run in this district was above average. Based on historical catch and escapement relationships during strong coho salmon runs in District 4, fishing can continue uninterrupted for three 12 hour periods per week without jeopardizing escapement. The coho catch peaked at 9,133 fish on 9 August (Table 14). The commercial salmon fishing season closed by regulation on 8 September. The 1995 coho salmon harvest of 66,203 fish is above the 10 year

average of 54,643 fish (Table 15). Permit holders were paid an average of \$0.41 per pound. The ex-vessel value of coho salmon in District 4 was \$207,900. Weather and water conditions prevented coho escapement assessment by aerial surveys, but sport fishing catches indicated coho salmon were well distributed throughout the drainage.

#### **Goodnews Bay (District 5)**

The Goodnews Bay district is the southernmost salmon district in the Kuskokwim area (Figure 5). Fishing primarily is with drift gill nets in tidal channels in Goodnews Bay and a few set nets near the mouth of the bay. Commercial effort peaked in 1988 when 125 permits holders fished and over the last decade has averaged 94 permit holders (Table 19). In 1995, effort was above average at 118 permit holders due to extension of fishing periods in the Goodnews Bay district.

A counting tower on the middle fork of the Goodnews River provided estimates of salmon escapement from 1981 through 1990. In 1991 a weir replaced the tower. This provided more accurate counts at a lower cost; the savings has allowed the project to enumerate the coho salmon escapement. The primary objective of this project is to provide daily escapement information to improve management of the commercial fishery. The Goodnews River weir project also provides a calibration of aerial survey accuracy.

In 1995 the Goodnews Bay district opened to commercial fishing on 29 June. Two 12 hour periods a week were allowed until the majority of the chinook salmon run had passed the commercial fishery. Over the last 4 years, the chinook salmon management strategy in this district has been to open the commercial fishery 5 to 7 days later than the normal historical opening date. This allows an increased escapement of chinook salmon into the Goodnews River drainage. In 1995, this strategy helped achieve an estimated passage of 4,836 chinook salmon through the Goodnews River weir, exceeding the escapement goal of 3,500 fish. The commercial harvest of 2,922 chinook salmon was below the ten year average of 3,224 fish (Table 20). Buyers in this district paid an average of \$0.60 per pound, which totaled \$31,339 paid for this species (Table 17).

The sockeye salmon catch in Goodnews Bay was above average during the first commercial period this season. As the season progressed, sockeye salmon increased in abundance in the district and escapement remained strong. When the department's weir on the Goodnews River began passing good numbers of sockeye, and it became apparent that the escapement goal was being approached, fishing time was increased from 12 to 36 hour periods between 10 July to 20 July (Table 18). This was the longest fishing time allowed during the peak of the sockeye salmon season. The commercial harvest in 1995 of 37,351 sockeye salmon was slightly above the ten year average of 35,887 fish (Table 20). Sockeye salmon prices averaged \$0.71 per pound resulting in \$175,552 paid to permit holders in 1995 (Table 17). The department's weir on the middle fork of the Goodnews estimated a sockeye salmon passage of 39,009, well beyond the escapement goal of 25,000 fish (Table 21).

The chum salmon catch is incidental to the sockeye salmon fishery in District 5. The 1995 catch of 19,832 fish was above the ten year average of 16,984 fish (Table 20). Permit holders were paid \$0.18 per pound for this species, for a total value of \$21,427 (Table 17). The chum salmon escapement of 33,699 fish at the Goodnews River weir exceeded the goal of 15,000 fish (Table 21).

The 1995 coho salmon catch of 17,875 fish was below the ten year average of 23,612 fish (Table 20). Commercial permit holders received \$0.39 per pound for this species resulting in a total of \$58,061 paid (Table 17). The Goodnews River weir enumerated 5,415 coho salmon in 1995. High water and poor flying conditions prevented any aerial surveys of the Goodnews River drainage in 1995.

## OUTLOOK FOR 1996

The Kuskokwim Area has no formal forecast for salmon returns. Broad expectations are developed based on an evaluation of brood year escapements, trends in harvest, and approximate trends in productivity.

### *Chinook Salmon*

Most chinook salmon return to the Kuskokwim Area at age 6, 5, or 4 so the primary brood years for 1996 will be 1990, 1991 and 1992. Chinook salmon escapement in the Kuskokwim River drainage is monitored by aerial surveys of selected streams and at Kogruklu River weir. Escapement data is also available from the Tuluksak River (operated 1991 through 1994) and Kwethluk River weirs (operated 1992) which were U.S. Fish and Wildlife Service projects. In Kuskokwim Bay, chinook escapement is monitored by aerial surveys of Kanektok and Goodnews Rivers and at Goodnews River weir.

### Districts 1 and 2

The 1996 return of chinook salmon to the Kuskokwim River in 1996 is expected to be at average or below average abundance. In 1990 chinook salmon passage at Kogruklu River weir was 2 percent above the minimum objective (Table 11) and the objectives were achieved in 4 of 9 aerial survey streams (Figure 6). In 1991 chinook passage at Kogruklu weir was 22 percent below the minimum objective and aerial survey objectives were achieved in 2 of 6 streams. In 1992 Kogruklu escapement was 32 percent below objective and 4 of 8 aerial survey objectives were achieved. In addition, for the past three years chinook abundance in the Kuskokwim River has been bolstered by strong survival of the 1989 brood year. The offspring from this brood year returned to the Kuskokwim River in 1993, 1994 and 1995 at ages 4, 5 and 6. This cohort was the dominant age group in the commercial catch during each of these years. The cohort will return as 7 year olds in 1996, but this age class usually constitutes less than 10 percent of the commercial catch.

The incidental commercial harvest of chinook salmon in the Kuskokwim River is driven by the intensity of the chum salmon directed fishery. Chum salmon abundance is expected to be below average, therefore the incidental chinook catch is also expected to be below average. Still, the chinook harvest may approach average levels if a proposed management plan is adopted which allows a commercial fishery on early run chum salmon stocks. The intent of this plan is to allow for a normal commercial harvest level of chinook salmon with minimal impact on the chum salmon population. This goal would be pursued by attempting to take advantage of run timing differences between the two species. The plan would allow commercial fishing to occur in mid June, before the bulk of the chum salmon begin to arrive. If the plan is accepted, the commercial harvest of chinook salmon is expected to be between 20,000 and 45,000 which is average to below average. If the plan is not accepted the harvest will likely be well below 20,000 (Table 22).

#### District 4

District 4, Quinhagak, currently has the only directed commercial chinook salmon fishery in the Kuskokwim area. The Kanektok River chinook salmon escapement index was well below objective levels in all three brood years (Table 16). The harvest trend in recent years has also been below average, except for 1995. As in the Kuskokwim River, the bulk of the 1995 commercial chinook harvest in District 4 was attributed to age 6 fish. The 1995 commercial harvest will likely be between 10,000 to 20,000 which is the lower half of the historic range (Table 22).

#### District 5

In District 5, Goodnews Bay, the chinook stocks have been depressed for most of the past several years and a rebuilding program has been underway. Escapement to Goodnews River was below objective in two of the three brood years (Table 21). The harvest trend has also generally been below average due to low returns and the impact of the chinook salmon rebuilding program. For the 1996 season the incidental catch of chinook salmon in District 5 will probably be between 2,000 and 3,000 which is in the central range of the past 10 years (Table 22).

#### *Sockeye Salmon*

Sockeye salmon return primarily at age 5 in the Kuskokwim area, so the 1991 brood year will have the most influence on the 1996 returns. In the Kuskokwim River, sockeye salmon harvest is incidental to the directed commercial fishery on chum salmon. Kuskokwim Bay districts support directed sockeye fisheries.

#### Districts 1 and 2

Sockeye salmon are harvested incidentally during the chum directed commercial fishery on the Kuskokwim River. The return of sockeye salmon to the Kuskokwim River is expected to be above average in 1996. The 1991 brood year escapement at Kogruklu River weir was well above average (Table 9), but it is only a small, second order tributary in the Kuskokwim River drainage and additional sockeye salmon escapement data is very limited. The quantity of sockeye salmon harvested in the Kuskokwim River will be driven by the intensity of the chum fishery in late June and early July. Given the poor outlook for the 1996 chum salmon return to the Kuskokwim River, and the temporal overlapping of the two species, the incidental sockeye harvest is expected to be between 30,000 and 60,000 (Table 22).

#### District 4

Sockeye salmon returns to District 4 are expected to be good in 1996. The 1991 brood year escapement as indexed by aerial surveys in the Kanektok River was 43,000 sockeye salmon, which is well above the escapement objective of 15,000 and the ten year average of 27,000 (Table 15). The 1991 return supported an average commercial harvest of 53,657 sockeye (Table 14). In the last few years the trend has been toward above average commercial harvests while still achieving escapement objectives. The sockeye harvest in District 4 is again expected to be between 50,000 and 80,000, which is above average (Table 22).

## District 5

District 5 is expected to have a good sockeye return in 1996. The 1991 brood year escapement past the Goodnews River weir was 47,000, which exceeded the objective of 20,000 to 30,000. The District 5 commercial harvest has been above average in recent years and the escapement objective has been achieved or exceeded. The harvest in 1995 returned to more normal levels, but sockeye escapement remained high at 39,000. The District 5 sockeye harvest is again expected to be average to above average, perhaps 35,000 to 70,000 (Table 22).

## *Chum Salmon*

Chum salmon return to the Kuskokwim Area primarily at 5 and 4 years of age, so the main brood years will be 1991 and 1992. The commercial fisheries in Districts 1 and 2 of the Kuskokwim River target chum salmon. Chum salmon catches in Districts 4 and 5 of Kuskokwim Bay are incidental to the directed sockeye fisheries.

## Districts 1 and 2

Below average numbers of chum salmon are expected to return to the Kuskokwim River in 1996. Spawning escapements for early running stocks are thought to be indexed by Kogruklu River weir. Brood year escapement at Kogruklu weir was 19 percent below objective in 1991, but 14 percent above objective in 1992 (Table 9). This may result in average abundance at the start of the 1996 season. However, the bulk of chum salmon production for the Kuskokwim River is attributed to the Aniak River drainage. Chums salmon timing in the Aniak River suggests this stock enters the Kuskokwim River a little later than the stocks indexed by Kogruklu River weir. Chum salmon escapement to the Aniak River in 1991 was 26 percent above objective while the 1992 escapement was 66 percent below objective. Conservation actions will likely be necessary to insure escapement needs at Aniak River are achieved. In recent years the Aniak River has demonstrated some widely fluctuating productivity in its chum salmon stocks. The cause of this volatility is unknown, but introduces a wider margin for error in the pre-season outlook. The 1996 chum salmon harvest in the Kuskokwim River is expected to be below average, perhaps in the range of 100,000 to 300,000 (Table 22).

## District 4

In District 4, aerial surveys of the Kanektok River have shown chum salmon escapements to be well below objective for the past several years (Table 15). However, the incidental harvest of chum salmon taken during the sockeye directed fishery has been well above average (Table 14). The chum salmon harvest is driven by the level of commercial effort targeting sockeye salmon. Consequently, the above average abundance of sockeye salmon in recent years has resulted in a higher than normal harvest of chum salmon. The increased harvests also correspond to an expansion in the number of permit holders participating in the District 4 fishery. This trend may continue in 1996 given the limited commercial fishing expected in the Kuskokwim River. The numbers of chum salmon harvested in District 4 has not shown the decline that would be expected from the aerial survey record. Escapement assessment in the Kanektok River is limited to aerial surveys which may be an inadequate index of chum salmon escapement to that river. Since the chum salmon commercial harvest is related to the directed sockeye salmon harvest, the chum salmon harvest in District 4 will likely be above average with a harvest of 60,000 to 90,000 (Table 22).

## District 5

In District 5, chum salmon escapement past the Goodnews River weir was 83 percent above objective in 1991 and 47 percent above objective in 1992 (Table 19). The chum salmon harvest is incidental to the sockeye directed fishery. Given the outlook of average sockeye salmon abundance in 1996, the incidental chum salmon harvest in District 5 is expected to be 10,000 to 20,000, which is near average (Table 22).

## *Coho Salmon*

Coho salmon return to the Kuskokwim Area primarily as 4 year old fish, so 1992 will be the key brood year for 1996 returns. There is very little information on which to base the coho salmon run outlooks. The Kogrukluk River and Tuluksak River weirs were the only coho salmon escapement projects in the Kuskokwim Area in 1992 and both these projects are located on small to moderate sized tributaries of the Kuskokwim River.

## Districts 1 and 2

Coho salmon escapement past Kogrukluk River weir in the 1992 brood year was 4 percent above objective. Tuluksak River weir was in its second year of operation in 1992 and total coho passage was 61 percent above the previous year. This compares to coho passage at Kogrukluk weir which was 62 percent better than the previous year. These escapement results suggest at least an average coho return in 1996, still that may not be the case. Poor escapements at Kogrukluk River weir in 1988 and 1990 did not foretell the record coho returns in 1992 and 1994. This apparent inconsistency in the ability to use escapement data to predict coho salmon abundance in the return year has not been the case historically, at least not for Kogrukluk River. For reasons unknown, it appears that coho salmon survival has been well above average in recent years. As a result the 1996 return may be larger than parent year escapement data would suggest. Given this uncertainty, the outlook for the Kuskokwim River coho return ranges from average to above average. Harvest is expected to be between 500,000 and 700,000 (Table 22).

## Districts 4 and 5

Commercial harvest data are the only guide to anticipating coho salmon returns in Districts 4 and 5. In 1992 the coho harvest in District 4 was well above average (Table 14). In the last five years coho salmon catches have been above average, ranging from 43,000 to 86,000. Based on brood year commercial catch data and the recent trend towards above average returns, the 1996 harvest is expected to be average to above average, in the range of 50,000 to 90,000 (Table 22).

In District 5 the coho harvest in the 1992 brood year was near average (Table 14). Harvest in the past five years has been volatile ranging from 13,000 to 47,000. The 1996 coho harvest in District 5 is expected to be within the range of 15,000 to 30,000.

## **TABLES**

Table 1. Utilization of Kuskokwim River chinook salmon, 1960-1995.

<u>Year</u>	<u>Commercial Harvest<sup>a</sup></u>	<u>Estimated Subsistence Harvest<sup>b</sup></u>	<u>Total Utilization</u>	<u>Running 10 Year Average</u>
1960	5,969	20,361	26,330	
1961	18,918	30,910	49,828	
1962	15,341	14,642	29,983	
1963	12,016	37,246	49,262	
1964	17,149	29,017	46,166	
1965	21,989	27,143	49,132	
1966	25,545	49,606	75,151	
1967	29,986	57,875	87,861	
1968	34,278	30,230	64,508	
1969	43,997	40,138	84,135	56,236
1970	39,290	69,204	108,494	64,452
1971	40,274	42,926	83,200	67,789
1972	39,454	40,145	79,599	72,751
1973	32,838	38,526	71,364	74,961
1974	18,664	26,665	45,329	74,877
1975	21,720	47,784	69,504	76,915
1976	30,735	58,185	88,920	78,291
1977	35,830	55,577	91,407	78,646
1978	45,641	35,881	81,522	80,347
1979	38,966	55,524	94,490	81,383
1980	35,881	59,900	95,781	80,112
1981	47,663	59,669	107,332	82,525
1982	48,234	53,310	101,544	84,719
1983	33,174	52,000	85,174	86,100
1984	31,742	57,000	88,742	90,442
1985	37,889	42,277	80,166	91,508
1986	19,414	51,019	70,433	89,659
1987	36,179	67,352	103,504	90,869
1988	55,716	53,877	109,593	93,676
1989	43,217	73,035	116,252	95,852
1990	53,504	71,281	124,785	98,753
1991	37,778	80,865	118,643	99,884
1992	46,872	58,239	105,111	100,240
1993	8,735	72,119	80,854	99,808
1994	16,211	79,688	95,899	100,524
1995	30,846	72,728 <sup>c</sup>	103,574	102,865
Ten Year				
Average	35,552	64,975	100,524	
(1985-1994)				

a District 1, 2 and 3.

b Estimated subsistence harvest expanded from villages surveyed.

c Previous 4 year average, subsistence catch not available at this time.

Table 2. Estimated dollar value of Kuskokwim Area commercial salmon fishery, 1964-1995.

<u>Year</u>	<u>Gross Value of Catch to Fishermen</u>	<u>Permits Fished<sup>a</sup></u>	<u>Average Income</u>
1964	83,030		
1965	90,950		
1966	87,466		
1967	138,647		
1968	290,370		
1969	297,233		
1970	362,470		
1971	371,220		
1972	360,727		
1973	827,735		
1974	1,056,042		
1975	899,178		
1976	1,380,229		
1977	3,891,950		
1978	2,337,470		
1979	3,678,000		
1980	2,725,134		
1981	3,766,525		
1982	4,213,954		
1983	2,670,400		
1984	5,809,000	774	7,505
1985	3,248,089	781	4,159
1986	4,746,089	789	6,015
1987	6,392,822	798	8,011
1988	12,514,492	811	15,431
1989	5,194,025	824	6,303
1990	4,865,070	824	5,904
1991	3,961,423	820	4,831
1992	5,295,912	814	6,506
1993	3,962,890	807	4,911
1994	5,201,611	797	6,526
1995	4,209,752	829	5,078
Ten year Average (1985-1994)	\$5,538,242	807	\$6,860

a Number of permits that made at least one delivery

Table 3. Kuskokwim Area commercial, subsistence, and personal use salmon catches, 1913-1995.

Year	COMMERCIAL CATCH						SUBSISTENCE CATCH			COMBINED
	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Other <sup>a</sup>	Total	TOTAL HARVEST
1913	7,800					7,800				7,800
1914		2,667				2,667				2,567
1915										
1916	949					949				949
1917	7,878					7,878				7,878
1918	3,055					3,055				3,055
1919	4,836					4,836				4,836
1920	34,853					34,853				34,853
1921	9,854					9,854				9,854
1922	8,944	6,120				15,064			180,000	195,064
1923	7,254					7,254				7,254
1924	19,253	900	7,167	7,167		34,487	17,700	203,148	220,848	255,335
1925	1,644	5,800				7,444	10,800	230,850	241,650	249,094
1926									738,576	738,576
1927									286,254	286,254
1928									481,090	481,090
1929									560,196	560,196
1930	7,626	2,448				10,074			538,650	548,724
1931	8,541					8,541			389,367	397,908
1932	9,339					9,339			746,415	755,754
1933							6,290	443,998	450,288	450,288
1934							20,800	597,132	617,932	617,932
1935	6,448		8,296			14,744	22,930	554,040	576,970	591,714
1936	624					624	33,500	549,423	582,923	583,547
1937	480					480			537,111	537,591
1938	624		828			1,452	10,153	400,242	410,395	411,847
1939	134					134	14,000	125,425	139,425	139,559
1940	247		500			747	8,000	415,523	423,523	424,270
1941	187		674			861	8,000	415,523	423,523	424,384
1942							6,400	325,339	331,739	331,739
1943							6,400	325,339	331,739	331,739
...										
1946	2,288		674			2,962				2,962
1947	5,356					5,356				5,356
...										
1951	4,210					4,210				4,210
...										
1954	57					57				57
...										
1959	3,760					3,760				3,760
1960	5,969	5,649	5,498		3	17,119	18,752	301,753	320,505	337,624
1961	23,246	2,308	5,090	91	18,864	49,599	27,457	179,529	206,986	256,585

- Continued -

Table 3. (page 2 of 3)

Year	COMMERCIAL CATCH						SUBSISTENCE CATCH				COMBINED TOTAL HARVEST
	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Coho <sup>b</sup>	Small <sup>c</sup>	Total	
1962	20,867	10,313	12,598	4,340	45,707	93,825	13,455	161,849	175,304	269,129	362,954
1963	18,571		15,660			34,231	33,180	137,649	170,829	205,060	239,291
1964	21,230	13,422	28,992	939	707	65,290	29,017	190,191	219,208	284,498	349,788
1965	24,965	1,886	12,191		4,242	43,284	24,697		250,878	275,575	318,859
1966	25,823	1,030	22,985	268	2,610	52,716	49,022		175,735	224,757	277,473
1967	29,986	652	58,239		8,235	97,112	60,919		214,468	275,387	372,499
1968	43,157	5,887	154,302	75,818	19,694	298,858	35,380		278,008	313,388	612,246
1969	64,777	10,362	110,473	1,251	50,377	237,240	40,208		204,105	244,313	481,553
1970	65,032	12,654	62,245	27,422	60,566	227,919	69,219	11,868	246,810	327,897	555,816
1971	44,936	6,054	10,006	13	99,423	160,432	42,926	6,899	116,391	166,216	326,648
1972	55,482	4,312	23,880	1,952	97,197	182,823	40,145	1,325	120,316	161,786	344,609
1973	51,374	5,224	152,408	634	184,207	393,847	38,526	23,746	179,259	241,531	635,378
1974	30,670	29,003	179,579	60,052	196,127	495,431	26,665	32,780	277,170	336,615	832,046
1975	27,799	17,535	109,814	899	223,532	379,579	47,569		176,389	223,958	603,537
1976	49,262	13,636	112,130	39,998	231,877	446,903	57,899	4,312	223,792	286,003	732,906
1977	58,256	18,621	263,728	434	298,959	639,998	57,925	12,193	203,397	273,515	913,513
1978	63,194	13,734	247,271	61,968	282,044	668,211	38,209	12,437	125,052	175,698	843,909
1979	53,314	39,463	308,683	574	297,167	699,201	57,031		163,451	220,482	919,683
1980	48,242	42,213	327,908	30,306	561,483	1,010,152	62,139	47,335	168,987	278,461	1,288,613
1981	79,378	105,940	278,587	463	485,635	950,003	63,248	28,301	163,554	255,103	1,205,106
1982	79,816	97,716	567,451	18,259	325,471	1,088,713	60,426	45,181	195,691	301,298	1,390,011
1983	93,676	90,834	249,018	379	306,554	740,461	51,020	2,834	149,172	203,026	943,487
1984	74,006	81,307	829,965	23,902	488,482	1,497,662	60,944	15,016	144,651	220,335	1,717,997

- Continued -

Table 3. (page 3 of 3)

Year	COMMERCIAL CATCH						SUBSISTENCE CATCH						COMBINED TOTAL
	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total	
1985	74,083	121,221	382,096	111	224,680	802,191	45,720	33,631	24,667	1,062	96,791	201,871	1,004,062
1986	44,972	142,029	736,910	16,569	349,268	1,289,748	54,256		29,742		142,930 <sup>c</sup>	226,928	1,516,676
1987	65,558	170,849	478,594	163	603,274	1,318,438	71,804	31,555	18,085	291	70,709	192,444	1,510,882
1988 <sup>d</sup>	74,552	149,927	623,719	37,592	1,443,916	2,239,786	56,695	25,571	32,426		118,181	232,873	2,565,615
1989 <sup>d</sup>	67,003	82,628	556,312	819	802,199	1,508,961	77,030	33,958	50,046		132,858	293,834	1,802,853
1990	84,706	203,374	445,062	16,082	522,535	1,272,759	77,328	32,218	44,519		108,557	262,622	1,535,381
1991	48,170	202,441	556,818	522	501,692	1,309,643	85,143	51,821	53,478		93,037	283,479	1,593,122
1992	67,597	192,341	772,449	85,978	436,506	1,554,871	61,499	31,497	40,155		87,954	221,105	1,775,956
1993	26,636	167,235	686,570	71	94,937	975,449	75,466	41,323	28,848		48,235	193,872	1,169,321
1994	27,345	191,169	856,100	84,870	360,893	1,519,228	84,009	32,403	29,914		63,831	210,157	1,729,385
1995	72,352	198,045	555,539	318	707,212	1,533,466							
Ten Year Average (1985-1994)	58,062	162,321	609,463	337 <sup>e</sup>	533,990	1,379,107	68,895	34,886 <sup>f</sup>	35,188		91,128 <sup>f</sup>	231,919	1,620,356

a Primarily chum and coho salmon.

b Reported subsistence coho salmon harvest only. Coho salmon subsistence harvest is poorly documented with no Kuskokwim River estimate attempted prior to 1988.

c Includes sockeye, pink and chum salmon.

d The personal use catch is included with the subsistence catch.

e Odd years only.

f Previous ten year average excluding 1986 when the small salmon were not differentiated.

Table 4. Mean salmon weights and prices paid to commercial fishers in the Kuskokwim Area, 1967-1995.

Year	Mean Weight - Pounds					Average Price - \$/Pound				
	Chinook	Sockeye	Coho	Pink	Chum	Chinook	Sockeye	Coho	Pink	Chum
1967	27.8	7.4	5.9	a	7.0	0.13	0.05	0.09	a	0.04
1968	23.8	6.2	7.2	4.0	7.9	0.16	0.10	0.09	0.05	0.04
1969	19.6	6.2	7.3	3.6	5.8	0.19	0.15	0.10	0.06	0.07
1970	18.9	5.4	7.3	3.3	6.1	0.20	0.21	0.14	0.08	0.08
1971 <sup>b</sup>	26.2	6.9	6.1	a	6.4	0.17	0.10	0.13	a	0.08
1972	a	a	a	a	a	0.20	a	0.16	a	0.08
1973	a	a	a	a	a	0.25	a	0.26	a	0.19
1974	a	a	a	a	a	0.46	0.34	0.27	0.23	0.25
1975	a	a	a	a	a	0.54	a	0.31	a	0.26
1976 <sup>c</sup>	17.0	6.7	7.8	3.5	7.0	0.64	0.43	0.40	0.25	0.27
1977	22.7	8.3	7.8	3.9	7.3	1.15	0.45	0.65	0.25	0.45
1978	24.2	6.5	7.1	3.9	8.9	0.50	0.49	0.40	0.12	0.32
1979	16.6	6.9	7.9	3.9	7.0	0.66	0.53	0.75	0.11	0.37
1980	14.1	6.7	6.9	3.6	6.4	0.47	0.31	0.64	0.12	0.24
1981	17.8	7.2	6.4	3.5	7.5	0.84	0.61	0.63	0.11	0.23
1982	19.3	7.2	7.3	3.6	7.3	0.82	0.41	0.53	0.05	0.22
1983	18.8	6.8	6.8	3.5	7.4	0.54	0.51	0.39	0.05	0.33
1984	16.4	6.6	7.7	3.2	6.7	0.89	0.52	0.55	0.07	0.28
1985	17.0	7.0	7.5	3.6	7.1	0.71	0.59	0.51	0.05	0.25
1986	17.0	7.2	6.4	3.4	6.8	0.80	0.70	0.60	0.05	0.25
1987	15.2	7.5	7.2	3.7	6.8	1.10	1.30	0.73	0.10	0.27
1988	15.1	7.3	7.5	3.4	8.1	1.30	1.42	1.25	0.15	0.40
1989	16.6	7.2	7.3	3.4	6.8	0.75	1.20	0.55	0.05	0.26
1990	15.1	6.7	6.5	3.2	6.9	0.56	1.05	0.75	0.12	0.26
1991	15.3	6.9	6.5	3.4	6.3	0.56	0.67	0.45	0.12	0.31
1992	13.4	7.0	7.3	3.9	6.8	0.66	0.90	0.45	0.06	0.32
1993	14.3	7.1	6.6	3.4	6.5	0.62	0.70	0.58	0.25	0.40
1994	15.6	6.9	7.6	3.6	6.6	0.51	0.53	0.57	0.08	0.21
1995	17.3	6.9	7.2	3.7	6.9	0.60	0.71	0.41	0.12	0.18
Ten Year Average (1985-94)	15.5	7.1	7.0	3.5	6.9	0.76	0.91	0.64	0.10	0.29

a Information unavailable.

b Information was not available for district 5.

c Information was not available for district 4.

Table 5. Commercial Fishing Effort in Kuskokwim Area by Permit-Hour<sup>a</sup>, 1960-1995.

Year	Dist. 1	Dist. 2	Dist. 3	Dist. 4	Dist. 5	Total
1960	5,136	960	648	4,368	Closed	11,112
1961	16,200	1,512	1,512	4,992	Closed	24,216
1962	14,274		0	8,434	Closed	22,708
1963	5,712	1,722	0	5,520	Closed	12,954
1964	6,468	1,140	0		Closed	7,608
1965	13,500	546	0	3,696	Closed	17,742
1966	18,270		Closed		Closed	18,270
1967	88,248	1,932		3,954	Closed	94,134
1968	77,466	720		7,986	4,704	90,876
1969	67,140	1,488		29,952	14,055	112,635
1970	56,646	3,414		22,080	9,756	91,896
1971	18,060	1,842				19,902
1972	47,802					47,802
1973	77,478	3,072		18,372	2,928	101,850
1974	124,569	4,950		18,984	8,148	156,651
1975	181,786	3,648		12,312	5,400	203,146
1976	82,788	3,894		14,784	4,848	106,314
1977	73,944	3,426		17,592	3,780	98,742
1978	71,856	1,892		14,952	3,672	92,372
1979	49,608	984		27,096	8,220	85,908
1980	33,370	714		21,636	9,504	65,224
1981	45,096	1,248		25,656	11,256	83,256
1982	46,108	1,128		22,656	14,556	84,448
1983	47,040	708		20,748	9,456	77,952
1984	62,643	1,050		31,488	14,004	109,185
1985	37,452	462		22,254	8,544	68,712
1986	48,744	606		25,740	10,572	85,662
1987	60,525	576		21,222	10,332	92,655
1988	81,724	912		27,440	14,064	124,140
1989	66,470	816		26,134	12,552	105,972
1990	50,642	1,051		44,520	10,548	106,761
1991	62,672	1,320		29,160	11,532	104,684
1992	54,288	1,164		35,380	15,180	106,012
1993	39,210	774		35,988	13,118	89,090
1994	54,750	702		26,580	15,768	96,800
1995	42,784	602		34,020	14,844	92,250
Ten Year Average (1985-94)	55,648	908		29,442	12,221	98,050

a The number of permits that made deliveries times the number of hours in the period.

Table 6. Executive summary of working group and department actions, 1995.

<u>DATE</u>	
17 June	Phil Mundy presented his report, "Recommendations for strengthening the cooperative management process of the Kuskokwim River Salmon Management Working Group." Short presentations were made on the 1995 salmon run outlook (ADF&G), a Kuskokwim chum salmon radio tagging study (BSFA), new test fisheries (AVCP), upriver issues and concerns (KNA) and Marketing issues (Inlet Salmon). Public testimony affecting management was heard.
18 June	The Working Group elected Joe Lomack and Stuart Currie Co-Chairs and amended their by-laws to establish the position of Vice-Chair. The Vice-Chair was defined as the Co-Chairs alternate with duties to act as Chair in the absence or at the pleasure of the Co-Chairs. New members were seated: Angela Morgan, mid-river subsistence, Francine Brown, sport fish, and Henry Hill, upriver commercial. <u>Dept. recommendation:</u> Meet again on 20 June <u>Working Group recommendation:</u> Meet again on 20 June <u>Actual outcome:</u> Working Group met on 20 June
20 June	<u>Dept. recommendation:</u> Four hour period in District W-1, downstream of Bethel on 22 June <u>Working Group recommendation:</u> Four hour period in District W-1, downstream of Bethel on 22 June <u>Actual outcome:</u> Four hour period in District W-1, downstream of Bethel on 22 June
23 June	<u>Dept. recommendation:</u> Four hour period in Districts W-1 and W-2 on 26 June <u>Working Group recommendation:</u> Four hour period in Districts W-1 and W-2 on 26 June <u>Actual outcome:</u> Four hour period in Districts W-1 and W-2 on 26 June
27 June	<u>Dept. recommendation:</u> Four hour period in Districts W-1 and W-2 on 29 June <u>Working Group recommendation:</u> Four hour period in Districts W-1 and W-2 on 29 June <u>Actual outcome:</u> Four hour period in Districts W-1 and W-2 on 29 June
30 June	The Working Group failed to make a quorum. The Working Group agreeded to leave responsibility for management for the Kuskokwim River salmon fishery to the Department until another Working Group Meeting could be called. Next meeeting to be at call of the Chairs. <u>Actual outcome:</u> Four hour period in Districts W-1 and W-2 on 3 July
5 July	<u>Dept. recommendation:</u> Four hour period in Districts W-1 and W-2 on 6 July <u>Working Group recommendation:</u> Six hour period in Districts W-1 and W-2 on 6 July - MOTION FAILED Four hour period in Districts W-1 and W-2 on 6 July <u>Actual outcome:</u> Four hour period in Districts W-1 and W-2 on 6 July

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Table 6. (page 2 of 3)

DATE	
7 July	<u>Dept. recommendation:</u> Four hour period in Districts W-1 and W-2 on 10 July <u>Working Group recommendation:</u> Four hour period in Districts W-1 and W-2 on 10 July <u>Actual outcome:</u> Four hour period in Districts W-1 and W-2 on 10 July
8 July	The Department presented a report on escapement and run assessment projects used for management of the Kuskokwim River commercial and subsistence salmon fishery. The meeting was held in Bethel.
10 July	The Department presented a report on escapement and run assessment projects used for management of the Kuskokwim River commercial and subsistence salmon fishery. The meeting was held in Aniak.
11 July	<u>Dept. recommendation:</u> Four hour period in Districts W-1 and W-2 on 14 July <u>Working Group recommendation:</u> Four hour period in Districts W-1 and W-2 on 14 July <u>Actual outcome:</u> Four hour period in Districts W-1 and W-2 on 14 July
17 July	<u>Dept. recommendation:</u> Six hour period in Districts W-1 and W-2 on 18 July <u>Working Group recommendation:</u> Six hour period in Districts W-1 and W-2 on 18 July <u>Actual outcome:</u> Six hour period in Districts W-1 and W-2 on 18 July
19 July	<u>Dept. recommendation:</u> Six hour period in Districts W-1 and W-2 on 21 July <u>Working Group recommendation:</u> Four hour period in Districts W-1 and W-2 on 21 July <u>Actual outcome:</u> Four hour period in Districts W-1 and W-2 on 21 July
24 July	<u>Dept. recommendation:</u> Meet again at the call of the Chair <u>Working Group recommendation:</u> Meet again at the call of the Chair <u>Actual outcome:</u> The Working Group met again on 2 August
2 August	<u>Dept. recommendation:</u> Meet again on 4 August <u>Working Group recommendation:</u> Six hour period in Districts W-1 and W-2 on 4 August <u>Actual outcome:</u> Six hour period in Districts W-1 and W-2 on 4 August
5 August	<u>Dept. recommendation:</u> Six hour period in Districts W-1 and W-2 on 8 August <u>Working Group recommendation:</u> Six hour period in Districts W-1 and W-2 on 8 August <u>Actual outcome:</u> Six hour period in Districts W-1 and W-2 on 8 August
7 August	Meeting in Bethel to discuss Kuskokwim River chum salmon management in 1996 and 1997. Based on very poor chum salmon escapements to the Aniak River in 1992 and 1993, commercial fishing in the Kuskowkim River may have to be severely restricted. The Working Group discussed ways to maximize the commercial salmon catch while protecting Aniak chum salmon.

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Table 6. (page 3 of 3)

DATE	
9 August	<u>Dept. recommendation:</u> Meet again on 11 August <u>Working Group recommendation:</u> Six hour period in Districts W-1 and W-2 on 11 August <u>Actual outcome:</u> Department will announce if they will accept the Working Group's recommendation by 1200 on 10 August. The Department vetoed the Working Group's recommendation.
11 August	<u>Dept. recommendation:</u> Six hour period in Districts W-1 and W-2 on 13 August <u>Working Group recommendation:</u> Six hour period in Districts W-1 and W-2 on 12 August <u>Actual outcome:</u> Six hour period in Districts W-1 and W-2 on 12 August
14 August	<u>Dept. recommendation:</u> Six hour period in Districts W-1 and W-2 on 16 August <u>Working Group recommendation:</u> Six hour period in Districts W-1 and W-2 on 16 August <u>Actual outcome:</u> Six hour period in Districts W-1 and W-2 on 16 August
17 August	<u>Dept. recommendation:</u> Six hour period in Districts W-1 and W-2 on 18 August <u>Working Group recommendation:</u> Six hour period in Districts W-1 and W-2 on 19 August <u>Actual outcome:</u> Six hour period in Districts W-1 and W-2 on 19 August
21 August	<u>Dept. recommendation:</u> Six hour period in Districts W-1 and W-2 on 23 August <u>Working Group recommendation:</u> Six hour period in Districts W-1 and W-2 on 22 August <u>Actual outcome:</u> Six hour period in Districts W-1 and W-2 on 22 August
24 August	<u>Dept. recommendation:</u> Six hour period in Districts W-1 and W-2 on 25 August or 26 August <u>Working Group recommendation:</u> Six hour period in Districts W-1 and W-2 on 26 August <u>Actual outcome:</u> Six hour period in Districts W-1 and W-2 on 26 August
28 August	<u>Dept. recommendation:</u> Six hour periods in Districts W-1 and W-2 on 29 August and 1 September <u>Working Group recommendation:</u> Six hour periods in Districts W-1 and W-2 on 29 August and 1 September and to close the season on 1 September <u>Actual outcome:</u> Six hour periods in Districts W-1 and W-2 on 29 August and 1 September Season closed on 1 September

Table 7. Lower Kuskokwim River, District 1, commercial salmon harvest and fishing effort by period, 1995.

PERIOD	DATE	HOURS	PERMITS	CHINOOK		SOCKEYE		COHO		PINK		CHUM	
				NUMBER	CPUE	NUMBER	CPUE	NUMBER	CPUE	NUMBER	CPUE	NUMBER	CPUE
1	6/22	4	569	6895	3.03	4420	1.94					49157	21.60
2	6/26	4	567	9452	4.17	17867	7.88					88091	38.84
3	6/29	4	566	4972	2.20	19770	8.73					88641	39.15
4	7/03	4	475	2847	1.50	17078	8.99			2		89427	47.07
5	7/06	4	481	1521	.79	14765	7.67					81246	42.23
6	7/10	4	494	906	.46	7100	3.59	21	.01	2		86368	43.71
7	7/14	4	435	546	.31	4219	2.42	221	.13	5		43137	24.79
8	7/18	6	336	366	.18	2482	1.23	671	.33	9		37294	18.50
9	7/21	4	368	202	.14	940	.64	1272	.86	6		21039	14.29
10	8/04	6	234	64	.05	123	.09	48665	34.66	5		1072	.76
11	8/08	6	611	95	.03	363	.10	98548	26.88	8		1229	.34
12	8/12	6	617	50	.01	359	.10	102421	27.67	8		899	.24
13	8/16	6	593	52	.01	147	.04	65713	18.47	12		208	.06
14	8/19	6	555	28	.01	87	.03	41057	12.33	8		133	.04
15	8/22	6	497	16	.01	113	.04	43978	14.75	7		157	.05
16	8/26	6	477	25	.01	117	.04	29129	10.18	10		101	.04
17	8/29	6	355	15	.01	45	.02	17790	8.35	8		39	.02
18	9/01	6	219	2		31	.02	5783	4.40	3		12	.01
TOTALS			712	28054	.43	90026	1.37	455269	6.95	93		588250	8.98

Table 8. Middle Kuskokwim River, District 2, commercial salmon harvest and fishing effort by period, 1995.

PERIOD	DATE	HOURS	PERMITS	CHINOOK		SOCKEYE		COHO		CHUM	
				NUMBER	CPUE	NUMBER	CPUE	NUMBER	CPUE	NUMBER	CPUE
1	6/26	4	16	1656	25.88	535	8.36			3628	56.69
2	6/29	4	13	707	13.60	620	11.92			3577	68.79
3	7/03	4	9	284	7.89	456	12.67			2200	61.11
4	7/06	4	8	74	2.31	331	10.34			2372	74.13
5	7/10	4	6	32	1.33	293	12.21			1874	78.08
6	7/14	4	2	7	.88	51	6.38			480	60.00
7	7/18	6	6	9	.25	44	1.22	6	.17	1638	45.50
8	7/21	4	5	4	.20	132	6.60	13	.65	899	44.95
9	8/04	6	6	10	.28	4	.11	1321	36.69	484	13.44
10	8/08	6	9	2	.04	6	.11	2816	52.15	379	7.02
11	8/12	6	8	5	.10	1	.02	2643	55.06	79	1.65
12	8/16	6	12	1	.01			4398	61.08	41	.57
13	8/19	6	5	1	.03			1679	55.97	4	.13
14	8/22	6	8			1	.02	1750	36.46	9	.19
15	8/26	6	3					712	39.56		
16	8/29	6	3					660	36.67	4	.22
17	9/01	6	1					194	32.33		
TOTALS			21	2792	1.51	2474	1.34	16192	8.76	17668	9.56

Table 9. Lower Kuskokwim River, District 1, and the middle Kuskokwim River, District 2, combined commercial salmon harvest, 1960-1995.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1960	5,969	0	2,498	0	0	8,467
1961	18,918	0	5,044	0	0	23,962
1962	15,341	0	12,432	0	0	27,773
1963	12,016	0	15,660	0	0	27,676
1964	17,149	0	28,613	0	0	45,762
1965	21,989	0	12,191	0	0	34,180
1966	25,545	0	22,985	0	0	48,530
1967	29,986	0	56,313	0	148	86,447
1968	34,278	0	127,306	0	187	161,771
1969	43,997	322	83,765	0	7,165	135,249
1970	39,290	117	38,601	44	1,664	79,716
1971	40,274	2,606	5,253	0	68,914	117,047
1972	39,454	102	22,579	8	78,619	140,762
1973	32,838	369	130,876	33	148,746	312,862
1974	18,664	136	147,269	84	171,887	338,040
1975	21,720	23	81,945	10	181,840	285,538
1976	30,735	2,971	88,501	133	177,864	300,204
1977	35,830	9,379	241,364	203	248,721	535,497
1978	45,641	733	213,393	5,832	248,656	514,255
1979	38,966	1,054	219,060	78	261,874	521,032
1980	35,881	360	222,012	803	483,211	742,267
1981	47,663	48,375	211,251	292	418,677	726,258
1982	48,234	33,154	447,117	1,748	278,306	808,559
1983	33,174	68,855	196,287	211	267,698	566,225
1984	31,742	48,575	623,447	2,942	423,718	1,130,424
1985	37,889	106,647	335,606	75	199,478	679,695
1986	19,414	95,433	659,988	3,422	309,213	1,087,470
1987	36,179	136,602	399,467	43	574,336	1,146,627
1988	55,716	92,025	524,296	10,825	1,381,674	2,064,536
1989	43,217	42,747	479,856	464	749,182	1,315,466
1990	53,759	84,870	410,332	3,397	461,624	1,013,982
1991	37,778	108,946	500,935	378	431,802	1,079,839
1992	46,872	92,218	666,170	7,451	344,603	1,157,314
1993	8,735	27,008	610,739	64	43,337	689,883
1994	16,211	49,365	724,689	30,949	271,115	1,092,329
1995	30,846	92,500	471,461	93	605,918	1,200,818
Ten Year Average (1985-1994)	35,577	83,786	531,208	223 <sup>a</sup>	476,637	1,132,715

a Odd years only.

Table 10. Chinook salmon sex ratios and proportion of females with gill net marks, Kogrukluk weir, 1979-1995.

<u>Year</u>	<u>Actual Count</u>	<u>Number Females</u>	<u>Sex Ratio (% female)</u>	<u>% of females with gill net marks</u>
1979	10,125	1,786	17.6	11.03
1980	676	136	20.1	a
1981	16,075	7,584	47.2	12.47
1982	5,325	2,431	45.7	12.99
1983	1,049	285	27.2	16.49
1984	4,928	1,146	23.3	11.08
1985	4,306	1,485	34.5	18.99
1986	2,968	705	23.8	19.43
1987 <sup>b</sup>	770			
1988	7,677	2,631	34.3	13.34
1989	4,911	1,884	38.4	16.46
1990	10,093	2,271	22.5	14.35
1991	6,132	2,860	46.6	19.26
1992	6,397	2,138	33.4	30.03
1993	10,516	2,961	28.2	11.25
1994	8,310	2,042	24.6	9.53
1995	18,876	8,687	46.0	12.32
1979-84 Average			30.2	10.68
1985-94 Average			31.8	16.96

a Gill net mark data was not reported

b Sample size too small to assess sex ratio and percentage of gill net marks

Table 11. Historic salmon escapement data from current Kuskokwim Area projects, 1976-1995.

Operating			SPECIES				
YEAR	Period		Chinook	Sockeye	Coho	Pink	Chum
KOGUGLUK WEIR <sup>a</sup> Objectives			10,000		25,000		30,000
1976	06/29 to 07/31		5,579	2,326	b	-	8,117
1977	07/14 to 07/27		1,945	1,637	b	2	19,444
1978	06/28 to 07/31		13,667	1,670	b	2	48,125
1979	07/01 to 07/24		11,338	2,628	b	1	18,599
1980	07/01 to 07/11		6,572	3,200	b	1	41,777
1981	06/27 to 10/25		16,655	18,066	11,455	6	57,365
1982	07/09 to 09/14		10,993	17,297	37,796	19	64,077
1983	06/22 to 07/02		2,992	1,176	8,538	-	9,407
1984	06/19 to 09/15		4,928	4,133	27,595	-	41,484
1985	06/29 to 09/07		4,619	4,359	16,441	-	15,005
1986	07/06 to 10/05		5,038	4,224	22,506	-	14,693
1987	08/09 to 09/23		4,063	b	22,821	-	17,422
1988	07/05 to 09/17		8,505	4,397	13,512	-	39,540
1989	07/07 to 09/14		11,940	5,811	b	-	39,548
1990	06/28 to 09/07		10,218	8,406	6,132	1	26,765
1991	07/04 to 09/15		7,850	16,455	9,933	4	24,188
1992	07/01 to 08/21		6,755	7,540	26,057	11	34,105
1993	07/02 to 09/06		12,332	29,358	20,517	0	31,899
1994	07/02 to 09/10		15,227	14,192	34,695	23	46,192
1995	07/02 to 09/06		20,630	10,996	27,856	2	31,265
ANIAK SONAR <sup>c</sup> Objective							250,000
1980	06/22 to 07/30		56,469	-	-	-	1,169,470
	08/16 to 09/12		-	-	81,556	-	-
1981	06/16 to 08/06		42,060	-	-	-	589,286
1982	06/21 to 08/01		33,864	-	-	-	442,461
1983	06/18 to 07/28		4,911	-	-	-	129,367
1984	06/16 to 07/30		-	-	-	-	266,976
1985	06/22 to 07/28		-	-	-	-	253,051
1986	06/26 to 07/24		-	-	-	-	209,080
1987	06/22 to 07/31		-	-	-	-	193,013
1988	06/22 to 07/31		-	-	-	-	401,511
1989	06/21 to 07/24		-	-	-	-	243,922
1990	06/23 to 08/06		-	-	-	-	232,260
1991	06/29 to 07/29		-	-	-	-	314,166
1992	06/22 to 07/29		-	-	-	-	84,269
1993	06/24 to 07/28		-	-	-	-	13,870
1994	06/28 to 07/28		-	-	-	-	388,163
1995	06/23 to 07/23		-	-	-	-	304,676

- continued -

Table 11. (page 2 of 2)

YEAR	Operating Period	SPECIES				
		Chinook	Sockeye	Coho	Pink	Chum
<u>TULUKSAK RIVER WEIR</u>						
1991	06/12 to 09/18	697	34	4,651	391	7,675
1992	06/24 to 09/10	1,083	129	7,501	2,458	11,183
1993	06/17 to 09/10	2,218	88	8,328	210	13,804
1994	06/29 to 09/11	2,922	94	8,213	3,450	15,707
<u>KWETHLUK RIVER WEIR</u>						
1992	06/18 to 09/12	9,675	1,316	45,605	45,952	30,596
<u>MIDDLE FORK GOODNEWS RIVER TOWER/WEIR<sup>d</sup></u>						
Objectives		3,500	25,000	NA	NA	15,000
1981	06/13 to 08/15	3,688	49,108	357	1,327	21,827
1982	06/23 to 08/03	1,395	56,255	62	13,855	6,767
1983	06/11 to 07/28	6,027	25,816	0	34	15,548
1984	06/15 to 07/31	3,260	32,053	249	13,744	19,003
1985	06/27 TO 07/31	2,831	24,131	282	144	10,367
1986	06/16 TO 07/24	2,083	51,069	163	8,133	14,756
1987	06/22 to 07/30	2,274	28,871	62	62	17,519
1988	06/23 to 07/30	2,712	15,799	6	6,781	20,799
1989	06/29 to 07/31	1,915	21,186	145	246	10,380
1990	06/19 to 07/24	3,636	31,679	0	3,378	6,410
1991 <sup>e</sup>	06/29 to 08/24	2,147	47,397	1,978	1,694	27,525
1992	06/29 to 08/25	1,899	27,267	150	23,030	22,023
1993	06/22 to 08/18	2,491	26,044	1,374	253	14,472
1994	06/23 to 08/08	3,856	55,751	309	38,705	35,134
1995	06/19 to 08/28	4,836	39,009	5,415	330	33,699

- a Pink salmon can pass freely through the Kogrukluk Weir.
- b No counts or incomplete count as project was not operated during the species' migration.
- c Aniak sonar counts are adjusted to provide the total estimated escapements.
- d The Goodnews River salmon counting tower's scheduled termination date precludes adequate assessment of the coho and pink salmon escapement.
- e The Goodnews tower was converted into a weir in 1991.

Table 12. Utilization of Kuskokwim River chum salmon, 1960-1995.

<u>Year</u>	<u>Commercial Harvest<sup>a</sup></u>	<u>Estimated Subsistence Harvest<sup>b</sup></u>	<u>Total Utilization</u>	<u>Running 10 Year Average</u>
1960	0	301,753 <sup>c</sup>	301,753	
1961	0	179,529 <sup>c</sup>	179,529	
1962	0	161,849 <sup>c</sup>	161,849	
1963	0	137,649 <sup>c</sup>	137,649	
1964	0	190,191 <sup>c</sup>	190,191	
1965	0	250,878 <sup>c</sup>	250,878	
1966	0	175,735 <sup>c</sup>	175,735	
1967	148	208,445 <sup>c</sup>	208,593	
1968	187	275,008 <sup>c</sup>	275,195	
1969	7,165	204,105 <sup>c</sup>	211,270	209,264
1970	1,664	246,810 <sup>c</sup>	248,474	203,936
1971	68,914	116,391 <sup>c</sup>	185,305	204,514
1972	78,619	120,316 <sup>c</sup>	198,935	208,223
1973	148,746	179,259 <sup>c</sup>	328,005	227,258
1974	171,887	277,170 <sup>c</sup>	449,057	253,145
1975	181,840	176,389 <sup>c</sup>	358,229	263,880
1976	177,864	223,792 <sup>c</sup>	401,656	286,472
1977	248,721	198,355 <sup>c</sup>	447,076	310,320
1978	248,656	118,809 <sup>c</sup>	367,465	319,547
1979	261,874	161,239 <sup>c</sup>	423,113	340,732
1980	483,211	165,172 <sup>c</sup>	648,383	380,722
1981	418,677	157,306 <sup>c</sup>	575,983	419,790
1982	278,306	190,011 <sup>c</sup>	468,317	446,728
1983	267,698	146,876 <sup>c</sup>	414,574	455,385
1984	423,718	142,542 <sup>c</sup>	566,260	467,106
1985	199,478	95,542	295,020	460,785
1986	309,213	141,931 <sup>c</sup>	451,144	465,734
1987	574,336	69,047	643,383	485,364
1988	1,381,674	117,008	1,498,682	598,486
1989	749,182	122,086	871,268	643,301
1990	461,624	96,273	557,897	634,253
1991	431,802	81,652	513,454	628,000
1992	344,603	85,203	444,607	625,629
1993	43,337	46,295	89,632	593,135
1994	271,115	59,255	330,370	569,546
1995	605,918	80,596 <sup>d</sup>	686,514	608,695
Ten Year Average (1985-1994)	476,636	91,429	545,472	

a District 1 and 2.

b Estimated subsistence harvest expanded from villages surveyed.

c Includes small numbers of small chinook, sockeye and coho salmon.

d The 1990 - 1994 average, with 1993 excluded due to emergency closures which made this year unlike any other.

Table 13. Quinhagak District commercial effort 1970-1995.

<u>YEAR</u>	<u>EFFORT<sup>a</sup></u>
1970	88
1971	61
1972	107
1973	109
1974	196
1975	127
1976	181
1977	258
1978	200
1979	206
1980	169
1981	186
1982	117
1983	226
1984	263
1985	300
1986	324
1987	310
1988	288
1989	227
1990	390
1991	346
1992	349
1993	409
1994	308
1995	382
TEN YEAR AVERAGE (1985-1994)	326

a Permits that made at least one delivery during that year.

Table 14. Quinhagak, District 4, commercial salmon harvest and effort by period, 1995.

PERIOD	DATE	HOURS	PERMITS	CHINOOK		SOCKEYE		COHO		PINK		CHUM	
				NUMBER	CPUE	NUMBER	CPUE	NUMBER	CPUE	NUMBER	CPUE	NUMBER	CPUE
1	6/13	12	116	7621	5.47	55	.04					182	.13
2	6/17	12	239	8190	2.86	356	.12					1916	.67
3	6/20	12	215	7341	2.85	485	.19					2760	1.07
4	6/24	12	173	6073	2.93	3266	1.57					5990	2.89
5	6/26	6	70	1506	3.59	805	1.92					2851	6.79
6	6/29	12	70	2048	2.44	4765	5.67					8231	9.80
7	7/03	12	37	1096	2.47	7045	15.87					8074	18.18
8	7/05	12	107	1073	.84	4366	3.40					7481	5.83
9	7/07	12	57	676	.99	4812	7.04					7138	10.44
10	7/10	12	85	804	.79	9894	9.70					5667	5.56
11	7/12	12	98	516	.44	6827	5.81					9074	7.72
12	7/14	12	112	438	.33	5738	4.27					5381	4.00
13	7/17	12	127	287	.19	5166	3.39			2		4193	2.75
14	7/19	12	79	140	.15	3532	3.73	2				3184	3.36
15	7/21	12	57	162	.24	2523	3.69	7	.01	4	.01	2086	3.05
16	7/24	12	52	156	.25	2610	4.18	93	.15	13	.02	2713	4.35
17	7/26	12	52	71	.11	1404	2.25	116	.19	9	.01	1279	2.05
18	7/28	12	43	63	.12	879	1.70	390	.76	19	.04	975	1.89
19	7/31	12	51	54	.09	730	1.19	954	1.56	26	.04	715	1.17
20	8/02	12	59	30	.04	583	.82	3706	5.23	16	.02	459	.65
21	8/04	12	65	37	.05	387	.50	4293	5.50	1		262	.34
22	8/07	12	100	49	.04	481	.40	4614	3.85	23	.02	260	.22
23	8/09	12	79	36	.04	307	.32	9133	9.63	10	.01	166	.18
24	8/11	12	90	31	.03	192	.18	5471	5.07	4		110	.10
25	8/14	12	112	25	.02	194	.14	4252	3.16	12	.01	98	.07
26	8/16	12	48	10	.02	133	.23	2515	4.37	3	.01	47	.08
27	8/18	12	68	10	.01	146	.18	5879	7.20	8	.01	49	.06
28	8/21	12	82	11	.01	139	.14	4816	4.89	3		26	.03
29	8/23	12	75	11	.01	102	.11	8588	9.54	1		27	.03
30	8/25	12	77	3		114	.12	2440	2.64	7	.01	25	.03
31	8/28	12	67	4		68	.08	4176	5.19	6	.01	17	.02
32	8/30	12	67	9	.01	58	.07	2193	2.73	8	.01	18	.02
33	9/01	12	41	3	.01	32	.07	2565	5.21	11	.02	8	.02
34	9/04	12	NO COMMERCIAL FISHING - NO BUYER										
35	9/06	12	NO COMMERCIAL FISHING - NO BUYER										
TOTALS			382	38584	.26	68194	.46	66203	.44	186		81462	.55

Table 15. Quinhagak District commercial salmon harvest, 1960-1995.

<u>Year</u>	<u>Chinook</u>	<u>Sockeye</u>	<u>Coho</u>	<u>Pink</u>	<u>Chum</u>	<u>Total</u>
1960	0	5,649	3,000	0	0	8,649
1961	4,328	2,308	46	90	18,864	25,636
1962	5,526	10,313	0	4,340	45,707	65,886
1963	6,555	0	0	0	0	6,555
1964	4,081	13,422	379	939	707	19,528
1965	2,976	1,886	0	0	4,242	9,104
1966	278	1,030	0	268	2,610	4,186
1967	0	652	1,926	0	8,087	10,665
1968	8,879	5,884	21,511	75,818	19,497	131,589
1969	16,802	3,784	15,077	953	38,206	74,822
1970	18,269	5,393	16,850	15,195	46,556	102,263
1971	4,185	3,118	2,982	13	30,208	40,506
1972	15,880	3,286	376	1,878	17,247	38,667
1973	14,993	2,783	16,515	277	19,680	54,248
1974	8,704	19,510	10,979	43,642	15,298	98,133
1975	3,928	8,584	10,742	486	35,233	58,973
1976	14,110	6,090	13,777	31,412	43,659	109,048
1977	19,090	5,519	9,028	202	43,707	77,546
1978	12,335	7,589	20,114	47,033	24,798	111,869
1979	11,144	18,828	47,525	295	25,995	103,787
1980	10,387	13,221	62,610	21,671	65,984	173,873
1981	24,524	17,292	47,557	160	53,334	142,867
1982	22,106	25,685	73,652	11,838	33,346	166,627
1983	46,385	10,263	32,442	168	23,090	112,348
1984	33,652	17,258	135,342	16,249	50,424	252,925
1985	30,401	7,876	29,992	28	20,418	88,715
1986	22,835	21,484	57,544	8,700	29,700	140,263
1987	26,022	6,489	50,070	66	8,557	91,204
1988	13,872	21,534	68,591	21,258	29,183	154,438
1989	20,820	20,582	44,607	273	39,395	125,677
1990	27,644	83,681	26,926	12,056	47,717	198,024
1991	9,480	53,657	42,571	115	54,493	160,316
1992	17,197	60,929	86,404	64,217	73,383	302,130
1993	15,784	80,934	55,817	7	40,943	193,485
1994	8,564	72,314	83,912	35,904	61,301	261,995
1995	38,584	68,194	66,203	186	81,462	254,629
Ten Year Average (1985-1994)	19,262	42,948	54,643	98 <sup>a</sup>	40,509	171,625

a Odd years only.

Table 16. Kanektok River peak aerial surveys by species, 1962-1995<sup>a</sup>.

Year	SPECIES			
	Chinook	Sockeye	Coho	Chum
1962	935	43,108		
1963				
1964				
1965				
1966	3,718			28,800
1967				
1968	4,170	8,000		14,000
1969				
1970	4,112	3,028		80,100
1971				
1972				
1973	814			
1974				
1975		6,018		
1976		2,936		8,697
1977	5,787	6,304		32,157
1978 <sup>b</sup>	19,180	44,215		229,290
1979				
1980	6,172	113,931	69,325	23,950
1981 <sup>c</sup>	15,900	49,175		71,840
1982 <sup>d</sup>	8,142	55,940		
1983	8,890	2,340		9,360
1984 <sup>e</sup>	12,182	30,840	46,830	48,360
1985	13,465	16,270		14,385
1986	3,643	14,949		16,790
1987	4,223	51,753	20,056	9,420
1988	11,140	30,440		20,063
1989	7,914	14,735		6,270
1990	2,563	32,082		2,475
1991 <sup>d</sup>	2,100	43,500	4,330	18,000
1992 <sup>f</sup>	3,856	14,955		25,675
1993	4,670	23,128		1,285
1994 <sup>g</sup>	7,386	30,090		10,000
1995 <sup>h</sup>			2,250	
10 YR AVG:	6,575	27,265	23,738	16,272
OBJECTIVE:	5,000	15,000		30,500

a Peak aerial surveys are those rated fair or good surveys obtained between 20 July and 5 August for chinook and sockeye salmon, 20-31 July for chum salmon, and 20 August and 5 September for coho salmon. Some surveys which do not meet these criteria may be referenced in this table; text are footnoted.

b Chum salmon count excluded from escapement objective calculation due to exceptional magnitude.

c Poor survey for chinook, sockeye, chum salmon.

d Late survey for chinook, sockeye salmon (after 5 August).

e Poor coho survey.

f Some chum may have been sockeye.

g Chum count not at peak, estimate made during chinook survey.

h Partial survey rated poor.

Table 17. Ex-vessel Value of Kuskokwim Area Salmon Catch by District, 1995.

<u>Lower Kuskowkim River, District W-1</u>						
	<u>Chinook</u>	<u>Sockeye</u>	<u>Coho</u>	<u>Pink</u>	<u>Chum</u>	<u>Total</u>
			<u>1995</u>			
Fish	28,054	90,026	455,269	93	588,250	1,161,692
Pounds	459,487	631,732	3,204,249	335	4,023,741	
Price	0.61	0.71	0.41	0.15	0.18	
Value	\$280,287	\$448,530	\$1,313,742	\$50	\$724,273	\$2,766,883
			<u>Ave. 1988-94</u>			
Fish	36,298	69,367	537,490	7,611	509,910	1,160,676
Value	\$384,610	\$471,700	\$2,338,428	\$2,558	\$1,115,251	\$4,312,548
<u>Middle Kuskokwim River, District W-2</u>						
			<u>1995</u>			
Fish	2,792	2,474	16,192	0	17,668	39,126
Pounds	48,002	17,789	109,547	0	123,359	
Price	0.60	0.70	0.41		0.18	
Value	\$28,801	\$12,452	\$44,914	\$0	\$22,205	\$108,372
			<u>Ave. 1988-94</u>			
Fish	1,172	1,654	22,090	35	16,281	41,232
Value	\$14,204	\$11,026	\$85,458	\$19	\$28,412	\$139,118
<u>Quinhagak, District W-4</u>						
			<u>1995</u>			
Fish	38,584	68,194	66,203	186	81,462	254,630
Pounds	695,048	460,161	507,085	689	589,118	
Price	0.60	0.70	0.40	0.12	0.18	
Value	\$417,029	\$322,113	\$202,834	\$83	\$106,041	\$1,048,099
			<u>Ave. 1988-94</u>			
Fish	16,194	56,233	58,404	19,119	49,488	199,438
Value	\$187,589	\$316,244	\$303,611	\$5,895	\$97,713	\$911,052
<u>Goodnews Bay, District W-5</u>						
			<u>1995</u>			
Fish	2,922	37,351	17,875	39	19,832	78,019
Pounds	52,231	250,789	148,874	143	142,848	
Price	0.60	0.70	0.39	0.13	0.15	
Value	\$31,339	\$175,552	\$58,061	\$19	\$21,427	\$286,398
			<u>Ave. 1988-94</u>			
Fish	2,909	42,758	24,455	5,511	19,060	94,693
Value	\$37,235	\$268,370	\$142,532	\$1,614	\$42,667	\$492,418
<u>Kuskowkim Area Total</u>						
			<u>1995</u>			
Fish	72,352	198,045	555,539	318	707,212	1,533,467
Pounds	1,254,768	1,360,471	3,969,755	1,167	4,879,066	
Price	0.60	0.70	0.41	0.13	0.18	
Value	\$757,456	\$958,647	\$1,619,551	\$152	\$873,946	\$4,209,752
			<u>Ave. 1988-94</u>			
Fish	56,573	170,012	642,439	32,277	594,740	1,496,040
Value	\$623,638	\$1,067,339	\$2,870,030	\$10,086	\$1,284,043	\$5,855,135

Table 18. Goodnews Bay, District 5, commercial salmon harvest and effort by period, 1995.

PERIOD	DATE	HOURS	PERMITS	CHINOOK		SOCKEYE		COHO		PINK		CHUM	
				NUMBER	CPUE	NUMBER	CPUE	NUMBER	CPUE	NUMBER	CPUE	NUMBER	CPUE
1	6/26	12	NO COMMERCIAL FISHING - NO BUYER										
2	6/29	12	30	914	2.54	1412	3.92					1242	3.45
3	7/03	12	32	264	.69	1427	3.72					2540	6.61
4	7/05	12	33	229	.58	2380	6.01					1324	3.34
5	7/07	12	38	274	.60	2476	5.43					2207	4.84
6	7/08	12	43	202	.39	4362	8.45					2090	4.05
7	7/10	36	59	326	.15	8140	3.83			2		4835	2.28
8	7/13	36	68	182	.07	4291	1.75					1361	.56
9	7/17	36	57	156	.08	3642	1.77					2115	1.03
10	7/20	36	36	109	.08	2601	2.01	1		1		1187	.92
11	7/24	12	26	54	.17	829	2.66	4	.01	4	.01	355	1.14
12	7/26	12	30	41	.11	852	2.37	6	.02	5	.01	226	.63
13	7/28	12	16	22	.11	578	3.01	3	.02	1	.01	81	.42
14	7/31	12	23	17	.06	667	2.42	30	.11	1		77	.28
15	8/02	12	23	20	.07	634	2.30	109	.39	4	.01	66	.24
16	8/07	12	23	17	.06	692	2.51	520	1.88	4	.01	62	.22
17	8/11	12	21	20	.08	146	.58	1289	5.12	2	.01	11	.04
18	8/14	12	26	13	.04	353	1.13	2455	7.87			15	.05
19	8/16	12	29	17	.05	310	.89	1290	3.71	3	.01	14	.04
20	8/18	12	30	10	.03	318	.88	2378	6.61			9	.03
21	8/21	12	34	11	.03	373	.91	2147	5.26	3	.01	5	.01
22	8/25	12	35	11	.03	353	.84	2039	4.85	3	.01	8	.02
23	8/28	12	29	11	.03	186	.53	2322	6.67	2	.01	1	
24	8/30	12	31	1		171	.46	2173	5.84				
25	9/01	12	25	1		158	.53	1109	3.70	4	.01	1	
TOTALS			118	2922	.06	37351	.82	17875	.39	39		19832	.44

Table 19. Goodnews Bay, District 5 commercial effort 1970-1995.

<u>YEAR</u>	<u>EFFORT<sup>a</sup></u>
1970	35
1971	16
1972	14
1973	21
1974	49
1975	50
1976	40
1977	34
1978	35
1979	30
1980	48
1981	48
1982	48
1983	79
1984	77
1985	69
1986	86
1987	69
1988	125
1989	88
1990	82
1991	72
1992	111
1993	114
1994	116
1995	118
TEN YEAR AVERAGE (1985-1994)	94

a Permits that made at least one delivery during that year.

Table 20. Goodnews Bay District commercial salmon harvest, 1968-1995.

<u>YEAR</u>	<u>CHINOOK</u>	<u>SOCKEYE</u>	<u>COHO</u>	<u>PINK</u>	<u>CHUM</u>	<u>TOTAL</u>
1968			5,458			5,458
1969	3,978	6,256	11,631	298	5,006	27,169
1970	7,163	7,144	6,794	12,183	12,346	45,630
1971	477	330	1,771	0	301	2,879
1972	264	924	925	66	1,331	3,510
1973	3,543	2,072	5,017	324	15,781	26,737
1974	3,302	9,357	21,340	16,373	8,942	59,314
1975	2,156	9,098	17,889	419	5,904	35,466
1976	4,417	5,575	9,852	8,453	10,354	38,651
1977	3,336	3,723	13,335	29	6,531	26,954
1978	5,218	5,412	13,764	9,103	8,590	42,087
1979	3,204	19,581	42,098	201	9,298	74,382
1980	2,331	28,632	43,256	7,832	11,748	93,799
1981	7,190	40,273	19,749	11	13,642	80,865
1982	9,476	38,877	46,683	4,673	13,829	113,538
1983	14,117	11,716	19,660	0	6,766	52,259
1984	8,612	15,474	71,176	4,711	14,340	114,313
1985	5,793	6,698	16,498	8	4,784	33,781
1986	2,723	25,112	19,378	4,447	10,355	62,015
1987	3,357	27,758	29,057	54	20,381	80,607
1988	4,964	36,368	30,832	5,509	33,059	110,732
1989	2,966	19,299	31,849	82	13,622	67,818
1990	3,303	35,823	7,804	629	13,194	60,753
1991	912	39,838	13,312	29	15,892	69,983
1992	3,528	39,194	19,875	14,310	18,520	95,427
1993	2,117	59,293	20,014	0	10,657	92,081
1994	2,570	69,490	47,499	18,017	28,477	166,053
1995	2,922	37,351	17,875	39	19,832	78,019
Ten year Average (1985-1994)	3,224	35,888	23,612	35 <sup>a</sup>	16,894	83,925

a Odd years only.

Table 21. Historical estimated salmon run size and commercial exploitation rate, Goodnews River, 1981-1995.

Year	Species	Middle Fork Tower Estimate	Middle Fork Aerial Survey Count as a Percentage of Tower Est.	Goodnews River Escapement Estimate	Goodnews Bay Subsistence Harvest Estimate	Goodnews Bay Commercial Harvest	Total Run Size Estimate	Exploitation* Rate (% of Run)
1981	Chinook	3,688	-b	7,766 <sup>c</sup>	1,409	7,190	16,365	53%
	Sockeye	49,108	-b	100,029 <sup>c</sup>	3,511 <sup>d</sup>	40,273	143,813	30%
	Chum	21,827	-b	53,799 <sup>c</sup>	-	13,642	67,441	20%
1982	Chinook	1,395	-b	2,937 <sup>c</sup>	1,236	9,476	3,649	78%
	Sockeye	56,255	-b	114,587 <sup>c</sup>	2,754 <sup>d</sup>	38,877	156,218	27%
	Chum	6,767	-b	16,679 <sup>c</sup>	-	13,829	30,508	45%
1983	Chinook	6,027	36%	14,398	1,066	14,117	29,581	51%
	Sockeye	69,955	1,518 <sup>d</sup>	11,716	83,189	16%		
	Chum	15,548	-b	38,323 <sup>c</sup>	-	6,766	45,089	15%
1984	Chinook	3,260	35%	8,743	629	8,612	17,984	51%
	Sockeye	32,053	27%	67,213	964	15,474	83,651	20%
	Chum	19,003	35%	117,739	189	14,340	132,268	11%
1985	Chinook	2,831	70%	7,979	426	5,793	14,198	44%
	Sockeye	24,131	11%	50,481	704	6,698	57,883	13%
	Chum	10,367	32%	25,025	348	4,784	30,157	17%
1986	Chinook	2,083	57%	4,094	555	2,723	7,372	44%
	Sockeye	51,069	28%	93,228	942	22,608	116,778	20%
	Chum	14,765	38%	51,910	191	10,355	62,456	17%
1987	Chinook	2,274	100%	4,490	816	3,357	8,663	48%
	Sockeye	28,871	85%	51,989	955	27,758	80,702	36%
	Chum	17,519	58%	37,802	578	20,381	58,761	36%
1988	Chinook	2,712	39%	5,419	310	4,964	10,693	49%
	Sockeye	15,799	30%	38,319	1065	36,368	75,752	49%
	Chum	20,799	21%	39,501	448	33,059	73,008	46%
1989	Chinook	1,915	67%	2,891	467	2,966	6,324	54%
	Sockeye	21,186	60%	35,476	869	19,299	55,644	36%
	Chum	10,380	28%	15,495	760	13,622	29,877	48%
1990	Chinook	3,636	-b	7,656 <sup>c</sup>	682	3,303	11,641	34%
	Sockeye	31,679	-b	64,528 <sup>c</sup>	905	35,823	101,256	36%
	Chum	6,410	-b	15,799 <sup>c</sup>	342	13,194	29,335	46%
1991 <sup>e</sup>	Chinook	2,147	-b	4,521 <sup>c</sup>	682	912	6,115	26%
	Sockeye	47,397	-b	96,544 <sup>c</sup>	900	39,838	137,228	30%
	Chum	27,525	-b	67,844 <sup>c</sup>	106	15,892	83,842	19%
1992	Chinook	1,899	53%	3,560 <sup>c</sup>	252	3,528	7,340	51%
	Sockeye	27,267	26%	67,681 <sup>c</sup>	905	25,696	94,282	37%
	Chum	22,023	35%	62,922 <sup>c</sup>	662	18,520	81,442	24%
1993	Chinook	2,491	53%	4,700 <sup>c</sup>	488	2,117	7,295	36%
	Sockeye	26,044	26%	100,169 <sup>c</sup>	572	59,293	160,390	28%
	Chum	14,287	35%	40,820 <sup>c</sup>	133	10,657	51,941	21%
1994	Chinook	3,856	-b	7,275 <sup>c</sup>	657	2,570	10,323	29%
	Sockeye	55,751	-b	214,426 <sup>c</sup>	652	69,490	284,844	25%
	Chum	34,849	-b	130,335 <sup>c</sup>	402	28,477	159,276	18%
1995	Chinook	4,836	-b	9,091	552	2,922	12,565	28%
	Sockeye	39,009	-b	149,794	787	37,351	187,932	20%
	Chum	33,699	-b	124,686	329	19,832	144,847	14%

a Commercial and subsistence exploitation

b Incomplete aerial survey results

c Average Middle Fork/Goodnews River escapement estimate ratio for 1983-1989 used to estimate Goodnews River escapement in years with no aerial survey data.

d Subsistence caught chum salmon is included in subsistence sockeye salmon harvest

e Goodnews Tower Project changed to weir project in 1991.

f Estimate based on recent 5 year average.

Table 22. Preliminary projections of the 1996 Kuskokwim Area commercial salmon harvest in thousands of fish by species and management district.\*

	KUSKOKWIM RIVER			MANAGEMENT DISTRICT			GOODNEWS BAY			KUSKOKWIM AREA TOTAL		
				QUINHAGAK								
CHINOOK	20	-	45	10	-	20	2	-	3	32	-	68
SOCKEYE	30	-	60	50	-	80	35	-	70	115	-	210
COHO	500	-	700	50	-	90	15	-	30	565	-	820
PINK <sup>b</sup>	30	-	3	10	-	60	1	-	18	41	-	81
CHUM	100	-	300	60	-	90	10	-	20	170	-	410
TOTAL	680	-	1108	180	-	340	63	-	141	923	-	1589

a Except as noted, all catches are based on catches from 1985 through 1995

b Kuskokwim Area pink salmon display a strong odd-even year cycle; the 1996 projections are based on the even years catches only.

## **FIGURES**



KUSKOKWIM MANAGEMENT AREA DISTRICT W-1

*KUSKOKWIM RIVER*

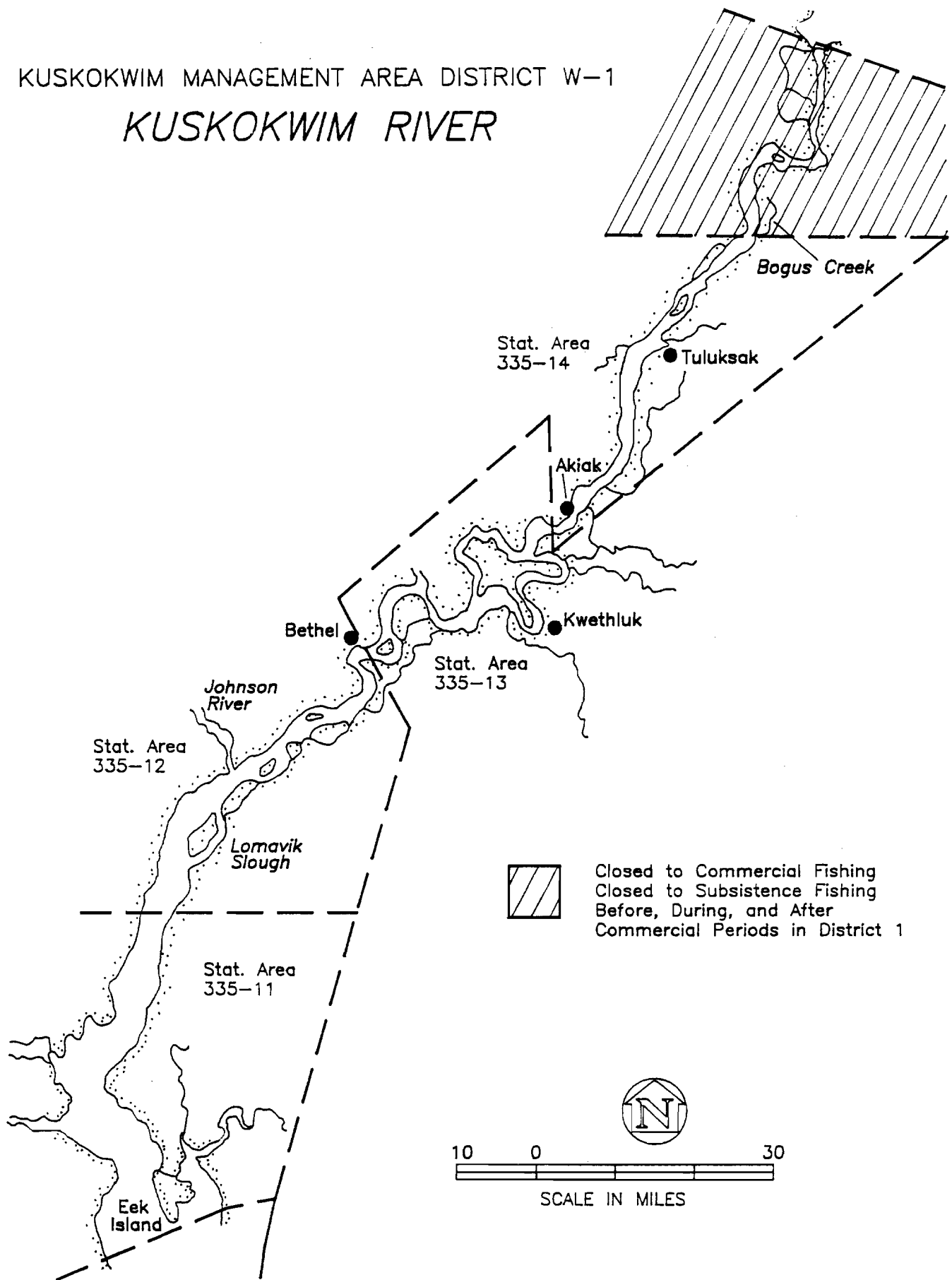


Figure 2. Kuskokwim Management Area, District W-1

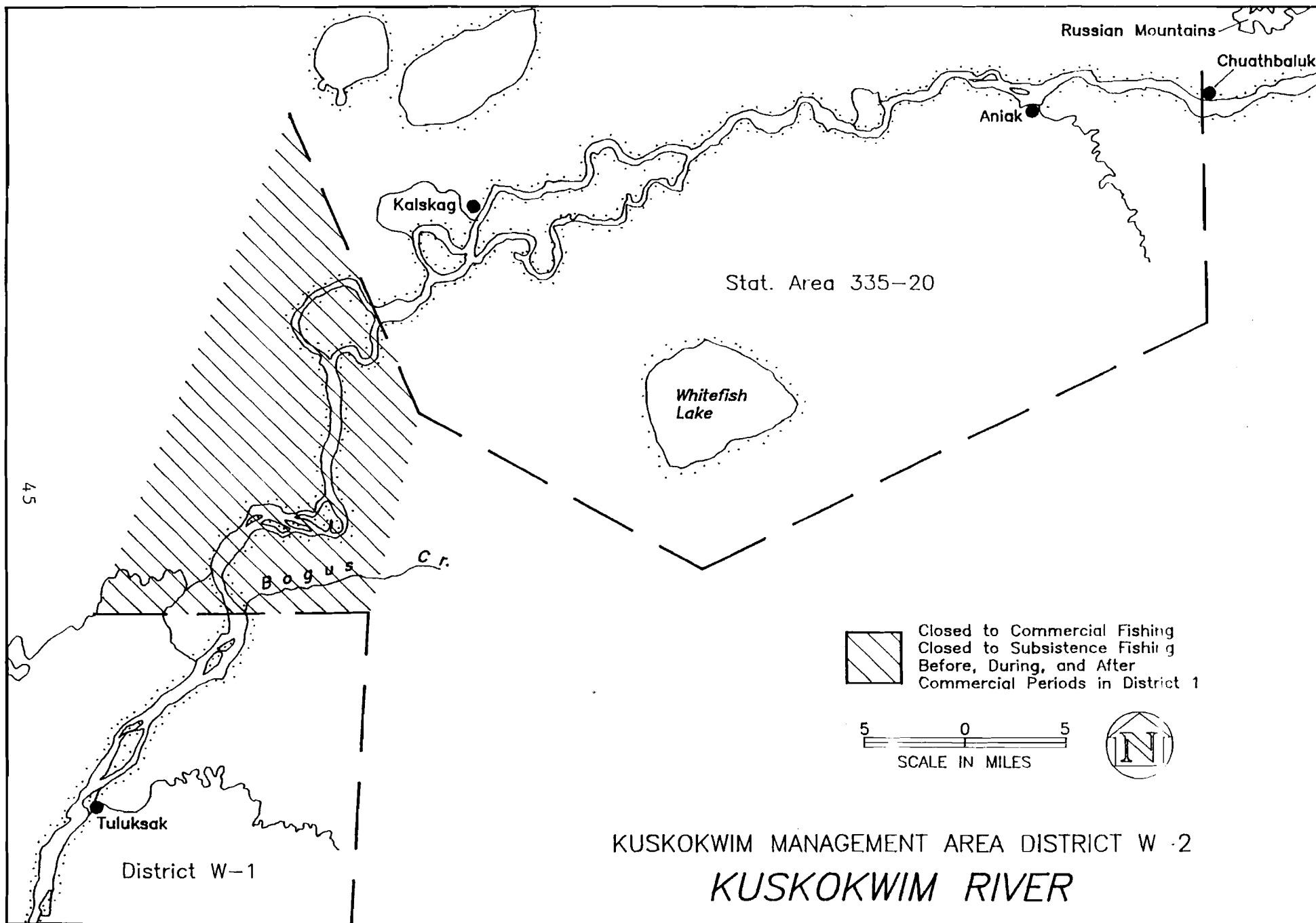
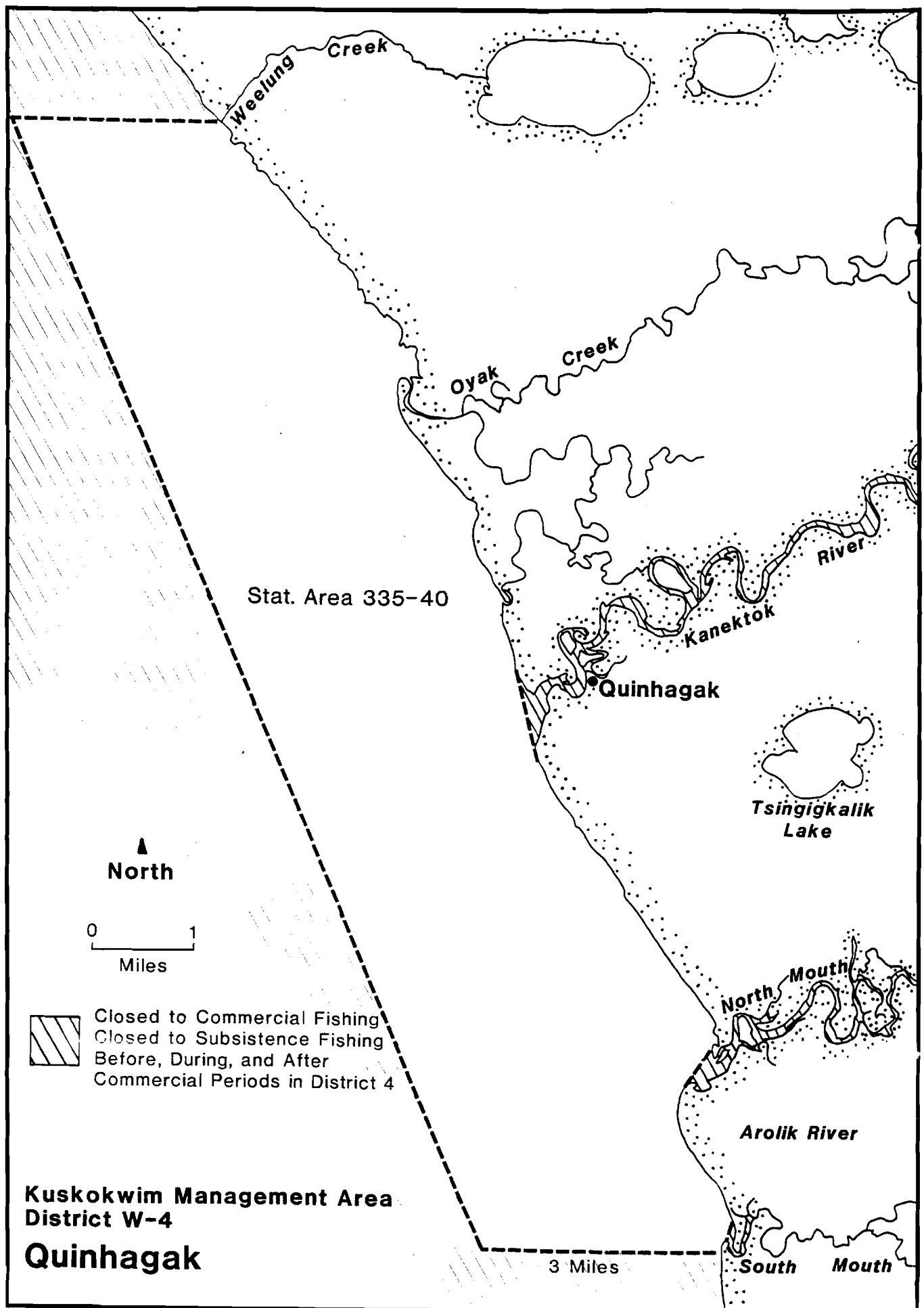


Figure 3. Kuskokwim Management Area, District W-2



**Figure 4 . Kuskokwim Management Area, District W-4**

Kuskokwim Management Area District W-5

Goodnews Bay

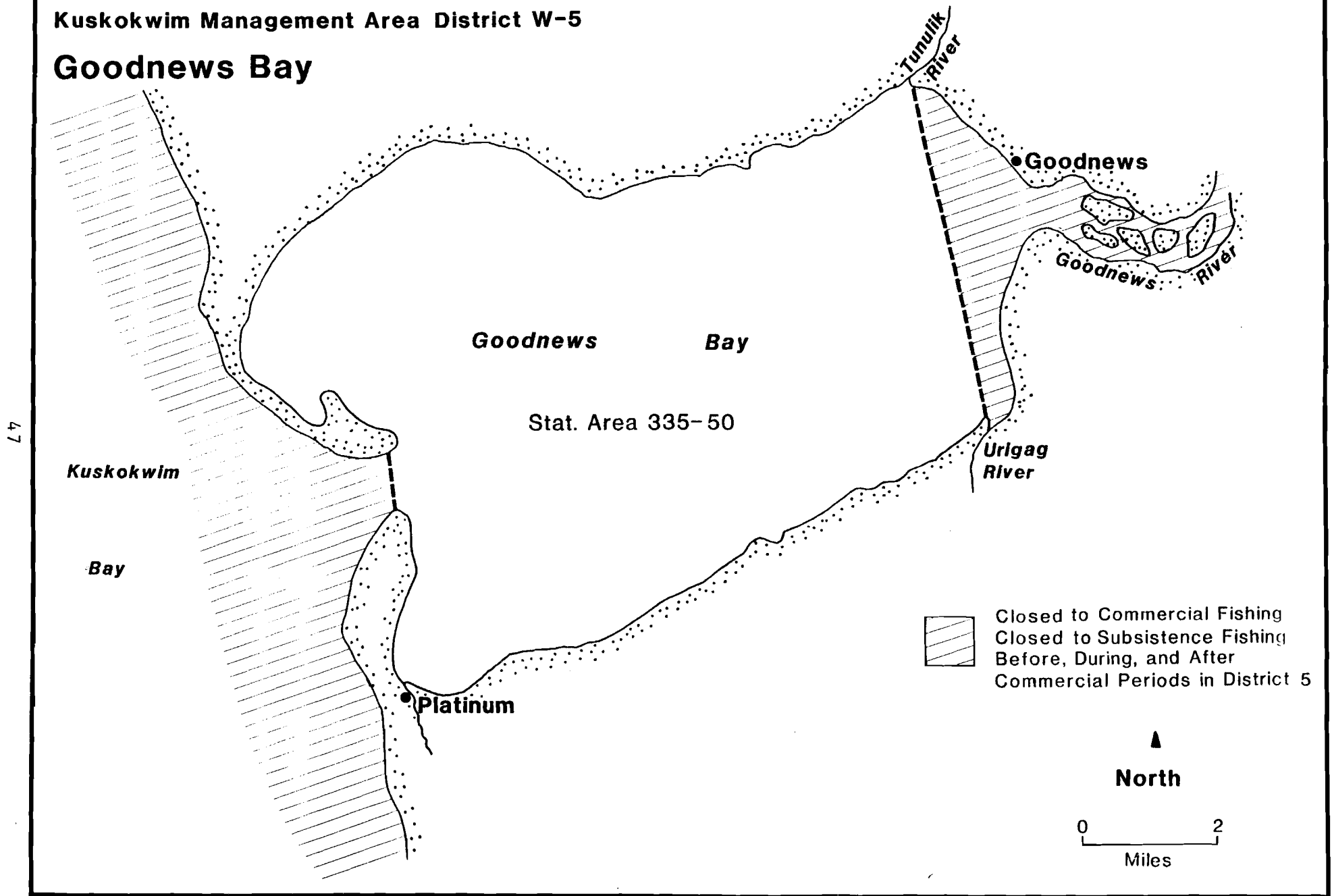


Figure 5. Kuskokwim Management Area, District W-5

## Kuskokwim River Chinook Salmon Escapement Index, 1975-1995.

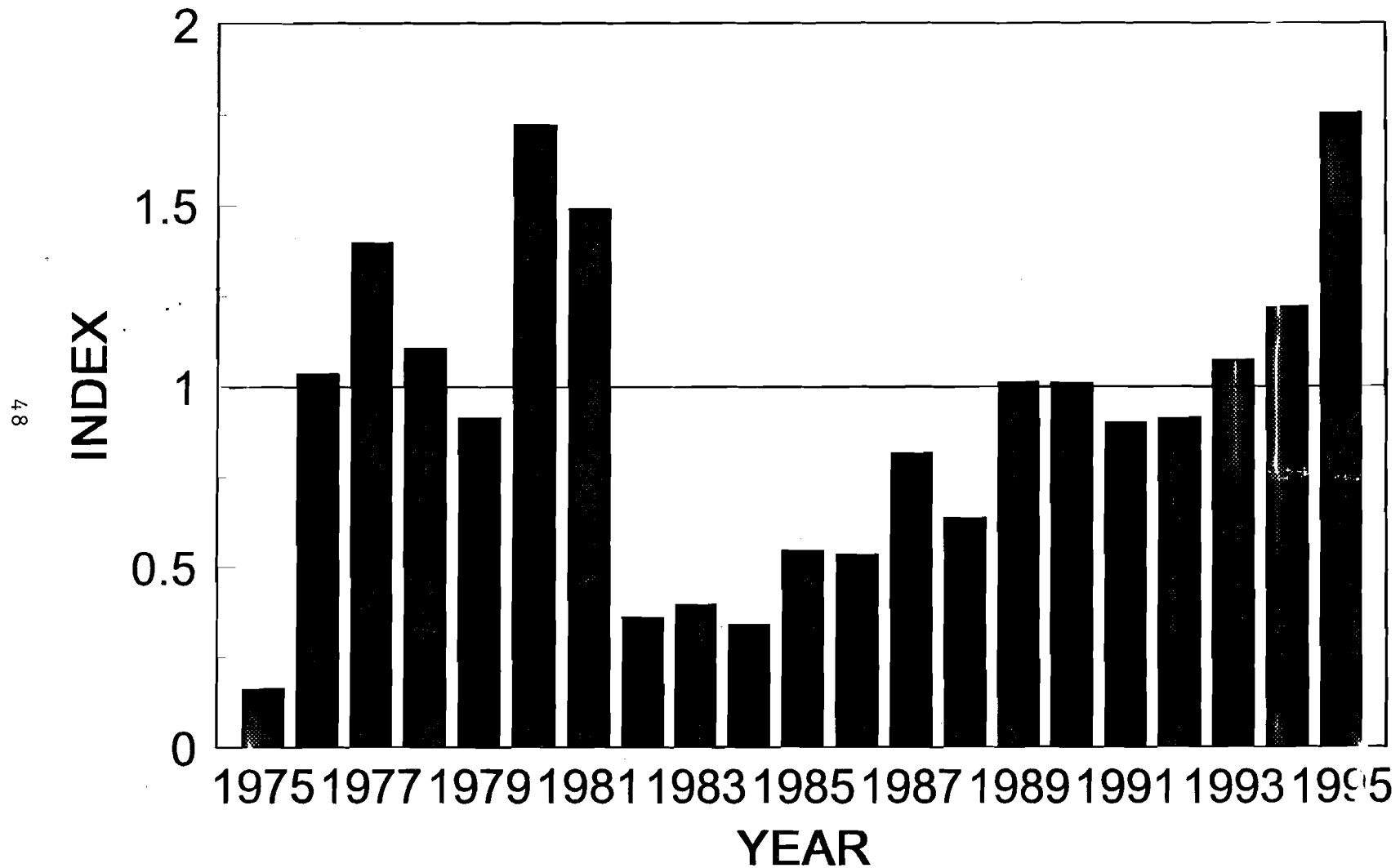


Figure 6. Estimated proportion of chinook escapement goal achieved for Kuskokwim River drainage. Based on median escapement goal proportion for streams sampled by aerial surveys.

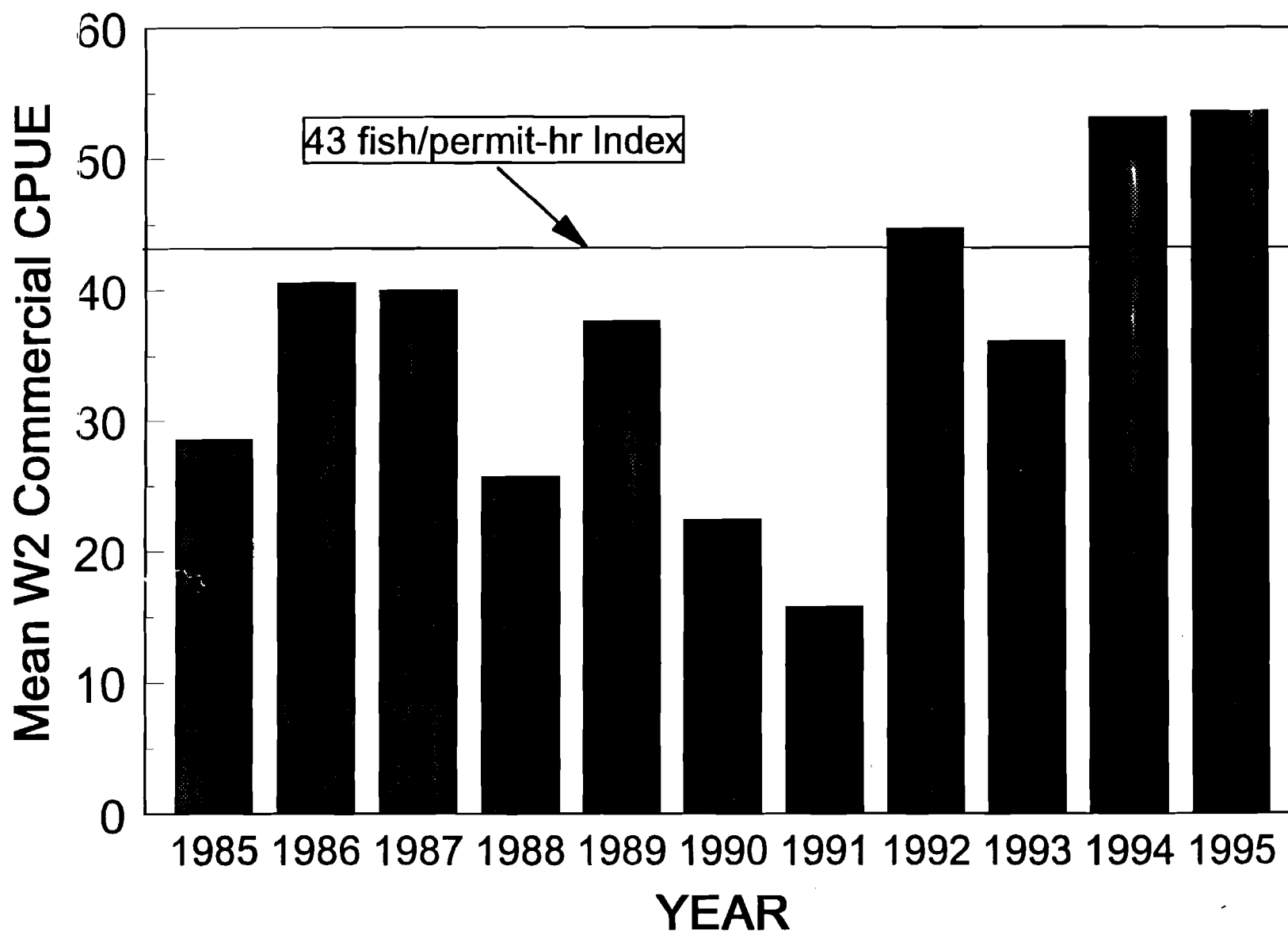


Figure 7. Mean commercial CPUE for coho salmon in district W-2 for the period 1-21 August. Index line of 43 fish/permit-hr corresponds roughly to the 25,000 coho salmon escapement goal at Kogrukluk River Weir.